DOCUMENT RESUME

ED 229 943 EC 151 952

AUTHOR Somwaru, Jwalla P.
TITLE Assessment of Basic Competencies: An Alternative to Intelligence Tests [and] A Training Manual.
PUB DATE [82]
NOTE 68p.
PUB TYPE Reports - Descriptive (141)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Disabilities; Elementary Secondary Education; Evaluation Methods; Handicap Identification; *Intelligence Tests; *Test Construction; *Testing; Test Interpretation; *Test Use
IDENTIFIERS *Assessment of Basic Competencies

ABSTRACT

Disadvantages of traditional intelligence tests with handicapped children are discussed, and an alternative approach, The "Assessment of Basic Competencies" (ABC) is presented. The background and design of the ABC and the three domains of the model (language skills, math reasoning skills, and information processing skills) are delineated. Test construction information is followed by data on scoring, reliability and validity. Potential applications are considered for identification of specific learning disabilities and mental retardation as well as assessment of student growth. A training manual for the ABC is also provided. (CL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

ED229943

ASSESSMENT OF BASIC COMPETENCIES: AN ALTERNATIVE TO INTELLIGENCE TESTS

Name of Author: Jwalla P. Somwaru, Ed.D.
Title: Assessment Specialist, Division of Special Services
Institution: Minnesota Department of Education
Address: 550 Cedar St., St. Paul, MN 55101

ABSTRACT

Intelligence tests were designed to assess individual differences, and have been used for classification and placement. In the current context of providing appropriate education for all handicapped students, there is need for a new instrument that would provide diagnostic information which could be interfaced with instruction. A conceptual alternative to intelligence tests is presented: it consists of the assessment of a student's performance on defined criteria which have known relevance to school learning. The procedure was operationalized by the development of 11 tests which represent sequences of learning in three broad domains: information processing, language, and mathematics. The results of assessment can be interpreted developmentally, or diagnostically; the diagnostic interpretation consists of the identification of clusters of skills which could be improved by instruction.

EC151952

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Jwalla P Somwaru
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

ASSESSMENT OF BASIC COMPETENCIES: AN ALTERNATIVE TO INTELLIGENCE TESTS

Who needs an I.Q.? Is it the student, the teacher, the diagnostician, or the psychologist? Most of us would answer, "No one." Yet intelligence tests continue to be given to children with a wide range of learning problems. Why is this so?

The answer to this question lies in a deep-seated belief which many of us entertain, even though subliminally, that there is an innate capacity for learning which is different from the content of learning. We distinguish between ability and achievement, and search for a discrepancy. In 1905, Binet wrote "Our purpose is to evaluate a level of intelligence. It is understood that we here separate natural intelligence and instruction. It is the intelligence alone that we seek to measure, by disregarding in so far as possible, the degree of instruction which the subject possesses" (Binet & Simon, 1961, p. 93). The extent to which this objective was achieved by Binet's early scales, or by the later Stanford-Binet tests, is well known among psychologists. School psychologists, who carry out the assessment of children with learning problems, generally agree that these tests do not measure innate ability. The inadequacies of current intelligence tests are recognized by school psychologists and educators alike. But in the presence of large numbers of children who manifest various kinds of learning problems, and the absence of a conceptual and operational alternative, individualized tests such as the Stanford-Binet and the Wechsler tests continue to be administered, and the resulting I.Q.'s duly recorded.

This paper presents a conceptual and an operational alternative to these conventional intelligence tests, and describes a novel battery of tests designed for the assessment of children with school learning problems.

The Conceptual Alternative

Binet's original purpose was to develop a clinical method for identifying children whose cognitive functioning was subnormal. The Stanford-Binet and Wechsler tests introduced several refinements in the measurement process; these tests continue to do a good job in measuring individual differences. But the need behind assessment has changed. All handicapped children are now, by statute, entitled to a free and "appropriate education" (Federal Register, 1977). Assessment for placement alone is no longer justifiable; assessment now must identify educational needs, so that appropriate educational programs may be provided for individuals who have learning problems. While it previously may have been enough for the school psychologist to report on a child's general level of functioning, as indicated by the I.Q. and inferred from observations, it is now necessary that the psychologist and other professionals on the assessment team provide more information, so that the teacher can meet requirements involved in preparing an Individualized Education Program (IEP) for the child. The teacher needs diagnostic information that can be interfaced with instructional behaviors. Even before the enactment of PL 94-142, this need for change in perspective had been identified by several educators and psychologists (McClelland, 1973; Tyler, 1948, 1969), but alternatives are being operationalized only very slowly.

In conventional intelligence tests, there is no necessary link between testing and teaching, or between testing and learning theory. The purpose of most current testing is to document individual differences in relative terms. The designers of these intelligence tests did not believe that they were assessing learned behaviors, and consequently, did not address the needs of educators by providing data which could be used for designing instruction. In contrast, testing is conceived by this author as an integral part of the teaching process. Since learning is cumulative, it is important that one assess the child's antecedent learnings so that appropriate subsequent programs of instruction can be designed. Gagne's cumulative learning model (Gagne, 1965) provides the theoretical basis for this formulation. In this school of thought, it is the test designer's responsibility to analyze the tasks within the domain of interest, and to build scales corresponding to natural learning sequences. When test items have been ordered and scaled, it is possible to report on developmental status within the defined domains, to identify gaps in learning, and to suggest what might be beneficially introduced into the learning experience of the child assessed.

All current intelligence tests measure children cross-sectionally. In other words, the performances of children of the same age group are related to the average performance of their peers. This is done separately for successive age groups. Intuitively, it is hoped that the sequence of items in these tests reflects the developmental capabilities of the children. During the last two decades, the heightened awareness of educators and school psychologists regarding the work of

Piaget and other developmental psychologists reflects a new kind of concern. It is now generally recognized that there are significant qualitative changes in the content and complexity of children's cognition as they grow and learn through successive stages, whether these stages are defined in Piagetian terms or not. Therefore, it is not enough to build scales that are cross-sectionally adequate; the scales also need to be developmentally sound. A test is adequate cross-sectionally if it discriminates satisfactorily among persons of the same age group; a test is developmentally sound if the constituent items have been vertically equated and scaled so as to locate a person in a developmental continuum. If a scale has a developmental character, it can be used to assess a child's status on a continuum of normal cognitive growth. What could be more useful in the study of mental retardation? To date, models of retardation have been based either on medical etiology or on the distribution of intelligence in the population (Scott, 1978); the need for developmental assessment in behavioral terms is real.

The raison d'etre for "special education" is the belief that most children with various kinds of disability can benefit from education or training. In other words, special education is based on the hope that some positive change will take place in the "disabled" child as a result of instruction and learning. Educators and program sponsors alike need an appropriate measurement system to assess how much change or growth has taken place as a result of their efforts. The I.Q. is not appropriate for at least two reasons. First, no vertical scaling has been imposed on any intelligence test yet developed. In all current

intelligence tests, the derived I.Q. is a standard score expressing performance relative to the mean of a defined age group; it cannot be presumed that 105 in one age group necessarily represents higher competence than 100 in another age group. Second, the I.Q. cannot conceptually accommodate the notion of growth. The use of mental age (M.A.) recognizes the need for an integrated continuous scale, but the M.A. itself does not constitute an equal-interval scale. What is badly needed in the field is a measurement system in which items (representing behaviors) have been vertically equated and scaled, with the scale itself consisting of equal unit intervals. Vertical equation enables the test designer to put together, into one sequence, items which differ qualitatively (such as items for ages 5 and 14), but still represent the same underlying trait; equal scale units allow for an assessment of cognitive growth in which a change of N units has the same meaning at all points along the developmental continuum.

Given the identified need for a test that has the capability to provide diagnostic evaluation, developmental assessment, and the measurement of growth, the question becomes: can such a test be developed so that intelligence tests can be replaced adequately? The recent development of a new test, the Assessment of Basic Competencies (Somwaru, 1979a), suggests that the answer is "yes." The remainder of this paper describes the process used to operationalize this test, and suggests some potential applications of the test.

The Operational Alternative: The Assessment of Basic Competencies

Model, Constructs, and Contents. The approach adopted for the design of the Assessment of Basic Competencies test may be described as

an assessment-intervention model. In essence, the model reflects the intent of the test designer to develop a procedure for generating systematic information which will be used as a basis for instructional intervention. In designing a test consistent with the assessment-intervention model, one must take stock of the given environmental conditions, identify the goals to be achieved, and then specify what is to be assessed. The environmental givens in this situation are assumed to be:

(a) A society in which education is compulsory for individuals of about 5 to 15 years of age, and one in which a white middle-class culture is dominant.

(b) A society in which English is the official language, and one in which a communication system is highly developed.

It is recognized that there are regional differences in social and economic life, and that there are various subcultures which have different language preferences. However, the dominance of the white middle-class culture and the use of the English language in education and public life, give public education a particular mission: it must prepare children to be able to fit into the mainstream of the social order as it exists. Those who cannot cope with the mainstream are considered to be disabled. The goal of the Assessment of Basic Competencies test is to assess children's competencies for coping with school learning in this environment.

Various disabilities have been viewed from an etiological point of view. However, in the absence of a well-developed science of etiology for disabilities or retardation, several educators have advocated a cross-categorical approach in which one seeks to identify behavioral

competencies, or their absence, in functional domains (Lerner, 1976). In this approach, one asks: what skills are important or contribute to school learning; what are the enabling skills for schooling in our culture? Figure 1 presents a model of the domains of significant cognitive skills. The main components of this model are: Information Processing skills, which are fundamental to all learning, and Language and Mathematics skills, which are based on previously acquired Information Processing skills, and which are fundamental for communication and further learning.

Insert Figure 1 about here

The skills in these three domains interact strongly with each other; together, they enable the acquisition of learning in conventional school subjects, as well as in general out-of-school activities. This model represents an integration of theory and research in the field, and derives support from the work of well known theorists such as Piaget (Flavell, 1963, 1971), Vigotsky (1962), Bruner (1959), Hunt (1961, 1973), Kagan (1970, 1971), Kohlberg (1968), Gagne (1968), and several researchers such as Elkind (1971; Elkind & Flavell, 1969), Klausmeier (Klausmeier, Ghatala, & Frayer, 1974), Weikart (1971), Peel (1964), and Bloom (1976). (A full review of the literature and sources will appear in the Technical Supplement to the Assessment of Basic Competencies, Somwaru and Sympson, in preparation.)

Figure 2 further explicates the content of the three domains of the model. Each domain is defined in terms of unique tests which measure different content. Each test consists of items measuring

clusters of skills. In a test, each cluster is represented by several items testing specific skills. It is believed that these skills are acquired with varying degrees of efficiency by children as they interact with the environment. These skills are considered "teachable," recognizing that some are more difficult to teach than others. It is estimated that about 80% of all children who are identified as having special needs have cognitive problems which are manifest in various forms of learning impairment within the framework of this model. The test battery was designed for the purpose of identifying which skills, or clusters of skills, are lacking, as well as to determine the overall level of a child's development in each learning sequence represented by a test. The specific skill tested by each item is identified at the foot of each test page (one item on each page), and all skills included in the test are listed together on the response form. The 12-page response form is intended to be among the materials returned by the diagnostician to the teacher, so that she or he can make a qualitative assessment by examining the responses of the student to clusters of skills.

Insert Figure 2 about here

This shift from deriving a global score for a miscellany of items, to an assessment of defined skills which are educationally significant, is one important difference between conventional intelligence tests and the Assessment of Basic Competencies (ABC).

Scaling of the Content of each Domain. Initially, over 2200 items were written, reviewed by experts, and revised. Then the items for

each test were ordered, on the basis of professional judgment as to their difficulty, and put into minitests consisting of 20 items each. There were 200 items (10 minitests) in seven of the tests, and 180 items (9 minitests) in four of the tests. These minitests were administered individually to samples of children selected on a stratified random basis in various types of communities across the U.S.A. and Canada. Stratification was done by region, type of community, race, and sex. Each minitest was given to approximately 210 students, about 70 students in the grade level for which the minitest would be of average difficulty, about 70 students in the grade level above this one, and about 70 students in the grade level below it. Each minitest thus was administered in three adjacent grade levels, as shown in Figure 3. This overlapping of grade levels provided the basis for the vertical linkage of the minitests prepared for each test.

Insert Figure 3 about here

Each minitest was calibrated separately, using Wingersky and Lord's (1973) computer program for the three-parameter latent-trait model. The goal of the calibration was to obtain difficulty and discrimination parameters for the items. The lower asymptote parameter was prespecified for the multiple-choice items, and set at zero for the open-ended items. After latent trait parameters were obtained for all items, the nine or ten minitests for each test were statistically linked in such a manner that all item parameters were placed on the same scale, called an ability scale. The result of this linking process was the creation of 11 equal-interval scales for the developmental assessment of 11

educationally important skills. The scale for each test was transformed so that the mean for Kindergarten children was set at about 140 and the mean for children in Grade 8 was set at about 190. In general, items which have a difficulty value around 100 are appropriate for age 3, while items with a difficulty value around 195 are appropriate for children in Grade 9. These scale values are approximate because the growth curves differ from test to test.

The ability scales are designed to locate a person's status in each developmental continuum as well as to assess growth or change. They are not appropriate for across-test comparisons since they are only equivalent at points 140 (mean for Kindergarten) and 190 (mean for Grade 8). The Developmental Age scales (described in a later section) have been specially designed to enable normative evaluation and across-test comparisons.

Selected calibrated items were used in assembling the final tests for the ABC battery. One hundred of the "better" items (in terms of discrimination, difficulty, and content) were selected for each of seven tests to be used with children from Age 3+ to Grade 9, while 85 were selected for each of four tests for children from Kindergarten to Grade 9. In the first round of selection, items with low discriminations were dropped. In the second round, when items were re-calibrated with discrimination held fixed, items were selected on the basis of their difficulty value and content. Content was considered in order to insure adequate representation of skills within each test. The result of this process was the selection and ordering of items at a distance of about one difficulty unit apart, on the average, in 11

different item sequences comprising the full diagnostic battery. Some items from the residual pool were selected and assembled into the Survey of Basic Competencies (Somwaru, 1979b), a quick screening device for the following four areas of competence (for the range Age 3+ to Grade 9):

Information Processing	(36 items)
Language	(36 items)
Reading	(30 items)
Mathematics	(36 items)

A further extension was the assembly of the Test of Early Learning Skills, a specially designed test for the age range 3½ to 5½ years (Somwaru, 1979c). This test consists of 18 items in each of the following areas: Thinking, Language, and Mathematics. It is intended to be used for the assessment of cognitive skills which children bring to the preschool or Kindergarten class.

Scoring and Reporting System to Facilitate Instruction. When the test battery is administered, an easily calculated raw score is obtained for each of the 11 tests; the raw score then is converted into an ability estimate. "Ability" is used here in a special sense, and does not denote general cognitive ability usually designated as intelligence. The term "estimate" makes it obvious that there is measurement error associated with any psychometric measure. Thus, the "ability estimate" indicates a point in the developmental continuum which underlies performance in each of the 11 tests. In recognition of the fact that measurement error exists, a confidence interval on the developmental scale is reported for each ability estimate. The confidence interval indicates the range of points within which the person's true ability is likely to lie. The ability estimate and confidence interval for each test are obtained

from a scoring table which is referenced by the raw score and the point of entry into the test. A student's point of entry (i.e., the difficulty of the first item administered) is chosen by the examiner on the basis of prior information, such as the student's grade level. The test is tailored for each student during administration; thus, all students do not attempt the same set of items. Nevertheless, different students' ability estimates are placed on the same scale, and are comparable to one another (see Figure 4).

Insert Figure 4 about here

An estimate of ability describes a location on a developmental continuum, and can be compared to previously obtained estimates in order to detect any change in cognitive status that has taken place since a previous testing. The estimate of ability can also be interpreted qualitatively by inspecting the content and complexity of items which are located at or around the point on the item difficulty scale which corresponds to the person's estimate of ability. The scaling procedure is such that there is a probability of .5 that a person with ability Y will know the answer to an item with difficulty X if Y and X are equal in value.

From a psychometric point of view, the estimate of ability is sufficient for measurement. However, to meet other needs, these estimates can be transformed into the following types of normative measures:

Developmental Age: the age for which an observed ability estimate is typical.

Percentile Rank/Age: the percentile rank of an ability estimate in a specific age-group, such as 7-year-olds.

Standard Score/Age: the standard score equivalent of an ability estimate in a specific age group, such as 7-year-olds.

Grade Equivalent: the grade level for which an observed ability estimate is typical.

A child's raw score, ability estimate, developmental age, percentile rank, standard score, and grade-equivalent for each test, are reported on the cover page of the Response Form. This graphic one-page summary accompanies 11 pages of detailed information (one page per test) identifying the skills tested by each item, and the student's response to each item. This 12-page booklet constitutes the basic report on performance and provides a solid foundation for writing a prescription or making recommendations for instructional intervention. This reporting system thus allows for both criterion-referenced and norm-referenced interpretations of test performance.

Testing the Test for Reliability and Validity. Analyses of field-test data provide several kinds of evidence for reliability and validity. Tables reporting these analyses are presented in the test manuals, but the following summaries are presented in Tables 1, 2, and 3 for convenience.

(a) The Assessment of Basic Competencies: Table 1.

1. Reliability was estimated by the method of test-retest correlation.
2. Validity was assessed by correlation with scores on S.R.A. Achievement Series in Grades 2 and 6, Wide-Range Achievement Test in Grades K to 6, and Teachers' Ratings.

3. The developmental character of the test was evaluated by correlation with age, grade, and WISC Test Age.

(b) Survey of Basic Competencies: Table 2.

1. Reliability was estimated by the method of test-retest correlation.
2. Validity was assessed by correlation with scores on S.R.A. Achievement Series in Grade 2, Wide-Range Achievement Test in Grades 1 to 6, and teachers' estimates of Grade Level.
3. The developmental character of the test was evaluated by correlation with age and grade.

(c) Test of Early Learning Skills: Table 3.

1. Reliability was estimated by the method of test-retest correlation.
2. Validity was assessed by correlation with scores on DIAL and LAP.
3. The developmental character of the test was evaluated by correlation with age.

On the whole, the evidence strongly suggests that the Assessment of Basic Competencies, the related Survey of Basic Competencies, and the

Test of Early Learning Skills, are reliable and valid for the purposes for which they were designed.

Potential Applications

Identification of Specific Learning Disabilities. The cognitive behaviors which the educational community is interested in assessing are listed in the test outline (see Figure 2) and operationally defined by the items included in each test. In each test, the items are ordered in terms of difficulty for the general student population. Because the relationships among the skills tested are not strictly hierarchical, and because there are variations in individual student learning, one should only expect the order of difficulty to be approximate for the individual student. Test users may reasonably expect that a student would get most items correct below the basal item (the highest of five consecutive items correct before the first error), some items correct and some wrong between the basal and ceiling (the highest item correct before five consecutive errors), and almost none correct above the ceiling. In diagnosing specific learning disabilities within a test, one could look for the following response patterns, which were suggested by the initial data collected on LD students:

(a) A low level of development in a skill, as indicated by only a few items correct at the lower end of the scale, followed immediately by a number of incorrect responses.

(b) Evidence of "splintered" learning, suggested by an unusually long string of correct and incorrect responses between basal and ceiling.

(c) Evidence of the absence of specific skills, as indicated by incorrect responses to clusters of items measuring those skills.

It is evident that specific disabilities could be manifested in one or more of these patterns in one of the tests in the battery, in one or more of the tests within any of the three domains (Information Processing, Language, or Mathematics), or across all three domains. A student could thus have one or more different forms of learning disability in one or more areas. The variability of patterns that do emerge suggests that it is inappropriate to label the student as learning disabled in general.

PL 94-142 refers to specific learning disabilities in "basic psychological processes" without defining such processes. It is suggested that the skills represented in the three Information Processing tests reflect some of the basic thinking processes that are important for school learning. The other areas identified in the PL 94-142, such as reading, language, and mathematics, are adequately represented in the Language and Mathematics tests of the ABC battery.

The Assessment of Basic Competencies thus constitutes a comprehensive and adequate assessment procedure for the determination of specific learning disabilities within the purview of PL 94-142. A definition of learning disability which is based on a discrepancy between ability and achievement is hypothetical and unwarranted; such a definition presumes that intelligence is a fixed innate ability which is measured by intelligence tests. It is proposed here that since one phase of learning leads to further learning, a learning disability is best defined in terms of discontinuities in a learning continuum. The ABC breaks away from tradition by providing psychologists and educators with several learning continua which could be used for making descriptive statements about learning deficits which constitute, or later

become, learning disabilities.

Assessment of Mental Retardation. The concept of retardation is essentially normative. Mental retardation is considered as subnormal cognitive functioning, generally signified by an I.Q. below 75. It is well known among psychologists and educators, however, that many children who display the hallmarks of retardation, such as low I.Q. and/or poor school work, do not necessarily show evidence of retardation in other adaptive behaviors. A report on "the six-hour retarded child" (President's Commission on Mental Retardation, 1970) suggests other possible considerations and interpretations. One possible correlate of retardation is the poor development of information processing skills, which in turn could adversely affect acquisition of language and mathematics skills, and which eventually could adversely affect all school learning. Poor development in any one area has a negative cumulative effect, and discontinuities could lead to muddled learning and the development of negative attitudes. Regardless of the cause or type of retardation, the ABC test battery could be used profitably to assess the nature and extent of retardation whenever it is believed that problematic school learning behaviors are a manifestation of such retardation.

But how is retardation determined? The ABC test and scaling procedures only provide the data base for making judgments. The ability estimate can be converted into a normative measure, such as developmental age, but then professional judgment must be used to determine whether one, two, or X years of deviation from the norm is significant enough to be labeled as retardation. Retardation could be defined in terms of performance in individual tests, performance in each domain,

or performance across all three domains. In the absence of a developed etiology for diagnosing and treating mental retardation, the ABC test battery offers a practical alternative to intelligence tests in the form of an instructionally oriented assessment procedure which incorporates developmental scaling.

Assessment of Growth. Teachers engage in different kinds of educational activity in the hope that some positive change will take place in pupils' learning. In other words, they hope to bring about growth. But the measurement of growth defies most current methods available. The problems of using derived scores, such as grade equivalents from norm-referenced tests, are well known. Standard scores are of no greater help. In order to adequately assess growth over time, the assessment procedure must possess the following properties:

(a) The various levels of the test must be vertically equated, and calibrated on a common scale.

(b) The measurement scale must have the property of equal-unit intervals.

(c) The estimate of ability must be independent of the particular items administered.

The measurement scale designed for the ABC possesses these three properties, as indicated in earlier sections of this paper. The technical basis for claiming that the ABC scales have these properties may be found in Sympson (1979); a full explication of latent-trait theory may be found in the standard text by Lord and Novick (1968). By virtue of these properties, the ABC test battery can be given at different times, and individual growth can be measured in terms of

changes in ability estimates. If necessary, ability estimates can be converted into the normative referents defined earlier.

Concluding Remarks

The development and use of intelligence tests, both individual and group, has been hailed as the most significant achievement of American psychology. The technology developed in this field was carried over into the assessment of aptitudes and achievement. Intelligence tests do a good job in measuring individual differences, if this is what is required. In the light of new needs, however, new instruments are needed. With the advances made in psychometric technology, we have no reason to remain bound to the concepts and limitations of classical test theory. In the development of the ABC, an attempt was made to apply modern test theory to meet society's current need for an instructionally-oriented assessment procedure for children who have school learning problems, but who, nevertheless, must be given an "appropriate" education.

References

Binet, A., & Simon, T. The development of intelligence in children (trans. by E. S. Kite). Reprinted in J. Jenkins & D. Patterson (Eds.), Studies in individual differences. New York: Appleton Century Crofts, 1961. Pp. 81-111.

Bloom, B. Human characteristics and school learning. New York: McGraw-Hill, 1976.

Bruner, J. S. Learning and thinking. Harvard Educational Review, 1959, 29, 184-192.

Elkind, D. Children's discovery of the conservation of mass, weight and volume: Piaget replication study II. In P. B. Sears (Ed.), Intellectual development. New York: John Wiley, 1971. Pp. 196-204.

Elkind, D., & Flavell, J. H. (Eds.). Studies in cognitive development. New York: Oxford University Press, 1969.

Federal Register, Dept. of H.E.W., U. S. Office of Education, December 29, 1977.

Flavell, J. H. The developmental psychology of Jean Piaget. New York: Van Nostrand, 1963.

Flavell, J. H. State-related properties of cognitive development. Cognitive Psychology, 1971, 2, 421-453.

Gagne, R. W. The conditions of learning. New York: Holt, Rinehart, & Winston, 1965.

Gagne, R. M. Contributions of learning to human development. Psychological Review, 1968, 75, 177-191.

Hunt, J. M. Intelligence and experience. New York: Ronald Press, 1961.

Hunt, J. M. Heredity, environment and class or ethnic differences. In Proceedings of the 1972 Invitational Conference on Testing Problems. Princeton, N. J.: Educational Testing Service, 1973.

Kagan, J. Cognitive development and programs for daycare. In E. H. Grotberg (Ed.), Day care: Resources for decisions. Washington, D.C.: Office of Economic Opportunity, U. S. Govt. Printing Office, 1971. Pp. 135-152.

Kagan, J., & Kogan, N. Individual variation in cognitive processes. In P. H. Mussen (Ed.), Carmichael's manual of child psychology (Vol. 1; 3rd ed.). New York: John Wiley, 1970. Pp. 1273-1365.

Klausmeier, H. J., Ghatala, E. S., & Frayer, D. A. Conceptual learning and development. New York: Academic Press, 1974.

Kohlberg, L. Early education: A cognitive-developmental view. Child Development, 1968, 39, 1013-1062.

Lerner, J. W. Children with learning disabilities. Boston: Houghton Mifflin, 1976.

Lord, F. M., & Novick, M. R. Statistical theories of mental test scores. Reading, Mass.: Addison-Wesley, 1968.

McClelland, D. C. Testing for competence rather than intelligence. American Psychologist, 1973, 28, 1-14.

Peel, E. A. Learning and thinking in the school situation. In R. E. Ripple & V. N. Rockcastle (Eds.), Piaget rediscovered: A report of the Conference on Cognitive Studies and Curriculum Development (March 1964). Ithaca, N. Y.: School of Education, Cornell University, 1964. Pp. 101-104.

President's Commission on Mental Retardation. The six-hour retarded child. Washington, D. C.: U. S. Govt. Printing Office (0-381-543), 1970.

Scott, K. G. Learning theory, intelligence, and mental development. American Journal of Mental Deficiency, 1978, 82, 325-336.

Somwaru, J. P. Assessment of basic competencies (Test battery, User's manual). Bensenville, Ill.: Scholastic Testing Service, 1979 (in press). (a)

Somwaru, J. P. Survey of basic competencies. Bensenville, Ill.: Scholastic Testing Service, 1979 (in press). (b)

Somwaru, J. P. Test of early learning skills. Bensenville, Ill.: Scholastic Testing Service, 1979 (in press). (c)

Somwaru, J. P., & Sympson, J. B. ABC: A technical supplement. Bensenville, Ill.: Scholastic Testing Service, in preparation.

Sympson, J.B. The Assessment of basic competencies: A new test battery. A paper presented at the annual convention of the American Psychological Association, New York, August, 1979.

Tyler, R. W. Educability and the schools. Reprinted in The Elementary School Journal, December, 1948, 201-212.

Tyler, R. W. Introduction to Educational evaluation: New roles, new means. Chicago: National Society for the Study of Education, 1969.

Vygotsky, L. S. Thought and language. New York: Wiley, 1962.

Weikart, D. P., Rogers, L., Adcock, C., & McClelland, D. The cognitively oriented curriculum. Urbana, Ill.: University of Illinois Press, 1971.

Wingersky, M. S., & Lord, F. M. A computer program for estimating examinee ability and item characteristic curve parameters when there are omitted responses (Research Memorandum No. 73-2). Princeton, N. J.: Educational Testing Service, 1973.

MODEL FOR DEVELOPMENTAL ASSESSMENT OF BASIC COMPETENCIES

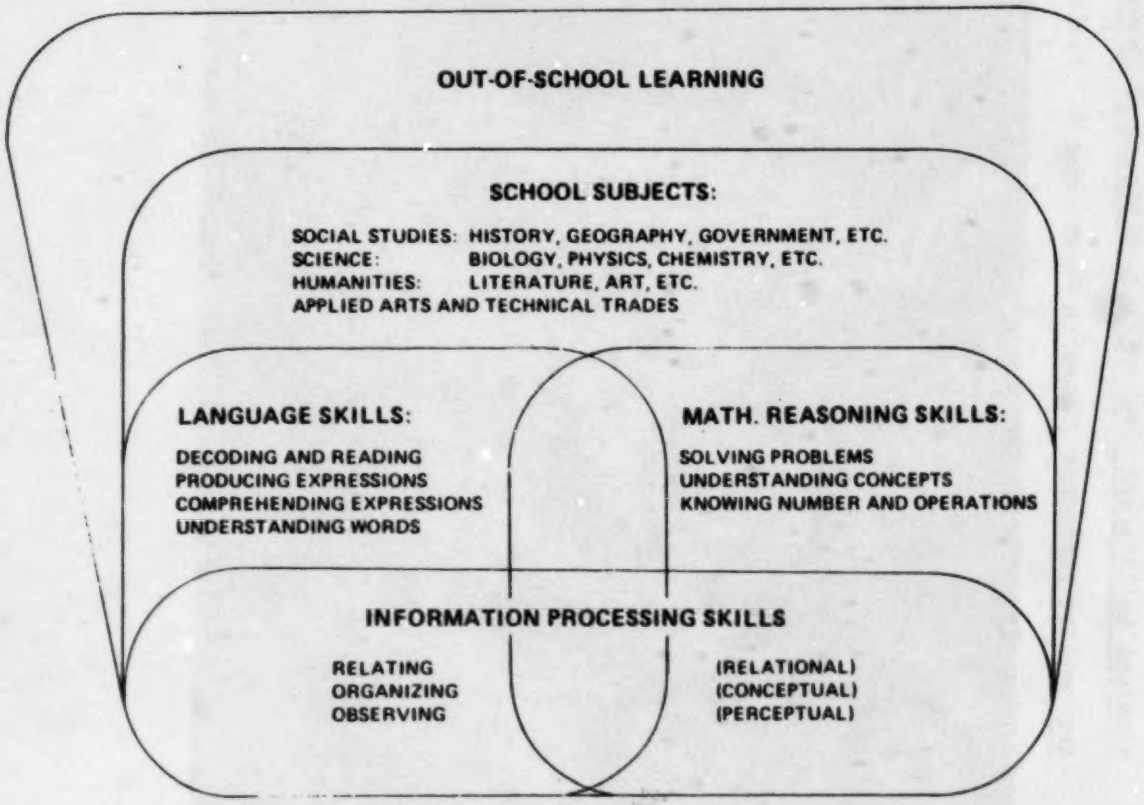


Figure 1

(Abstracted from User's Manual, Assessment of Basic Competencies. Copyright reserved by author)

DEFINITION OF BASIC COMPETENCIES

LANGUAGE SKILLS

READING:
Literal and inferential comprehension-detail, main idea, sequence, cause-effect.

DECODING:
Knowing letters and sounds, discriminating between sounds, pronouncing words.

COMPREHENDING and PRODUCING EXPRESSIONS:
Using nouns, adjectives, adverbs, pronouns.
Using verbs, auxiliary, modal, copula.
Using function words – prepositions, determiners, conjunctions, qualifiers, etc.
Understanding sentence structure.
Transforming sentences.
Knowing usage and idioms.

UNDERSTANDING WORDS:
Words for objects, descriptions, actions, categories, and abstract ideas.

MATH. REASONING SKILLS

SOLVING PROBLEMS:
Solving problems involving various applications in 1, 2, or 3 steps.

UNDERSTANDING CONCEPTS:
Sets and relations.
Number sentences and symbolic expressions.
Units of measurement – English and metric.
Units of money and combinations.
Geometry and graphs.

KNOWING NUMBER AND OPERATIONS:
Number and numeration.
Order
Four operations with whole numbers, common and decimal fractions.
Conservation of number.

INFORMATION PROCESSING SKILLS

RELATING:
Identifying incongruent relations, inferring rules, completing analogies, solving combinations, making transitive inference, solving problems.

ORGANIZING:
Excluding from class, including in class, relating classes, ordering in sequence.

OBSERVING:
Comparing for similarity or difference, seeing and remembering, completing patterns, visualizing figures after rotation, integrating eye-hand activity, finding figure in background, conserving mass, length, weight, volume.

Figure 2

(Abstracted from User's Manual, Assessment of Basic Competencies. Copyright reserved by author)

Sampling Plan for a Single ABC Test

Minitests	Items Included	Age			Grade								
		3+	4+	K	1	2	3	4	5	6	7	8	9
A	1-20	X	X	X									
B	21-40		X	X	X								
C	41-60			X	X	X							
D	61-80				X	X	X						
E	81-100					X	X	X					
F	101-120						X	X	X				
G	121-140							X	X	X			
H	141-160								X	X	X		
I	161-180									X	X	X	
J	181-200										X	X	X

Note: Each X represents 70 students drawn at random.

Figure 3

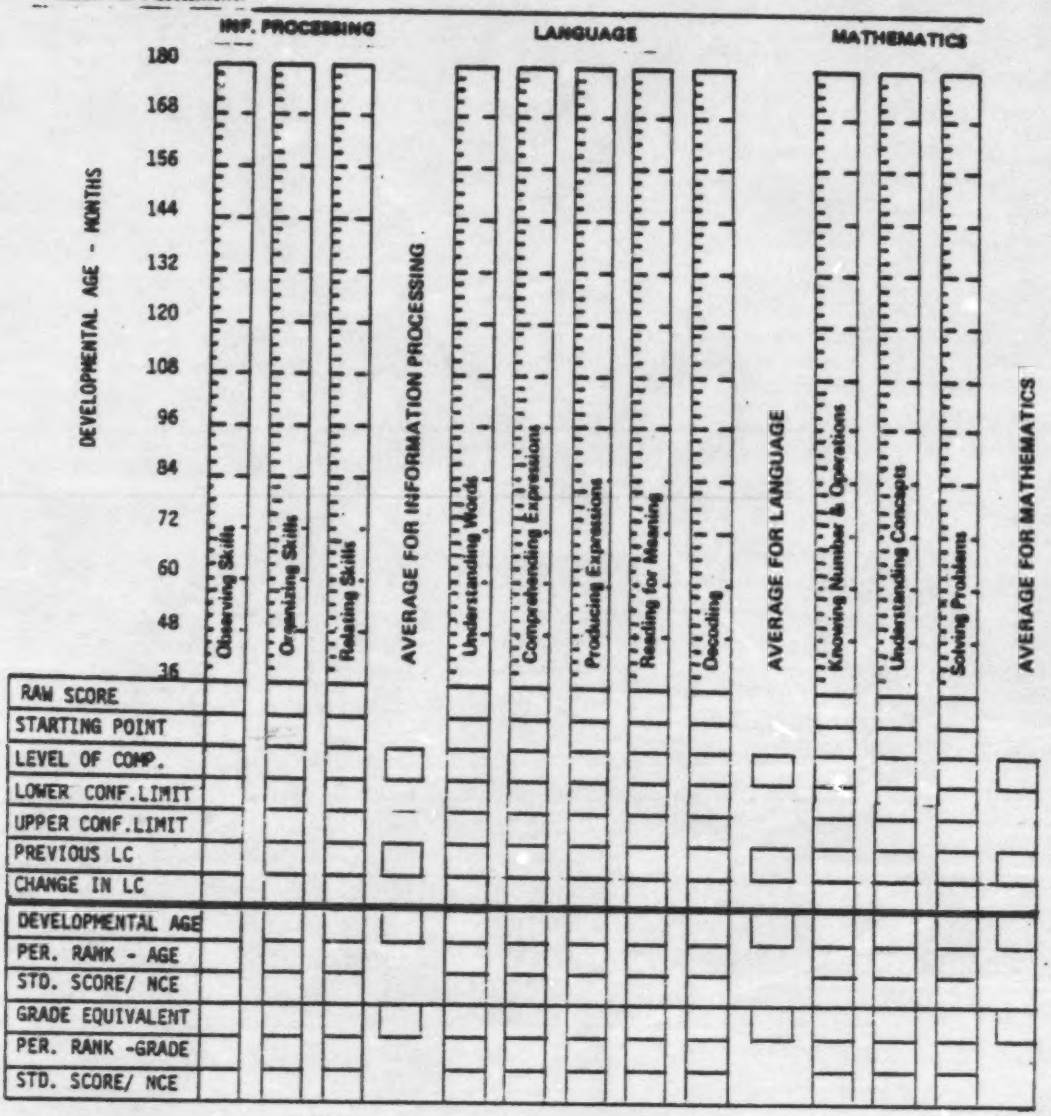
ASSESSMENT OF BASIC COMPETENCIES — RESPONSE FORM

Name: _____ Date of Testing: Yr. ____ Mth. ____ Day ____

School: _____ Date of Birth: Yr. ____ Mth. ____ Day ____

Teacher: _____ Grade: ____ Age (Nearest Mth.) _____ Sex: ____

Reason for Assessment: _____



Referred by: _____ Assessed by: _____

Figure 4

TABLE 1

ASSESSMENT OF BASIC COMPETENCIES: CORRELATION STUDIES

SUBTESTS AND GROUPS	Reliability			Validity															Development		
				SRA Ach. Grade 2				SRA Ach. Gr. 6				WRAT: Gr. K-6			TEACHERS' RATINGS: Gr. 6							
	Grade 2	Grade 6	Grades K-6	Composite	Reading	Language	Math.	Composite	Reading	Language	Math.	Reading	Spelling	Arith.	General Ability	Language	Reading	Math Computation	Math Problems	Correl. with Age	Correl. with Grade	Correl. with WISC Age
Observing	.88	.94	.91	.32	.37	.29	.19	.67	.53	.57	.60	.64	.77	.76	.64	.56	.53	.59	.60	.72	.75	.65
Organizing	.94	.94	.90	.43	.40	.46	.39	.65	.53	.59	.56	.64	.78	.75	.62	.58	.57	.59	.61	.74	.76	.64
Relating	.96	.94	.95	.45	.51	.38	.43	.76	.67	.67	.63	.61	.74	.76	.68	.66	.58	.59	.58	.72	.75	.59
INFORMATION PROCESSING	.96	.98	.96	.49.	.53	.46	.42	.74	.62	.66	.63	.66	.79	.78	.69	.65	.60	.63	.64	.76	.79	.65
Understanding Words	.89	.92	.90	.49	.47	.51	.44	.56	.55	.59	.44	.66	.74	.75	.42	.41	.45	.43	.39	.72	.74	.62
Comprehending	.89	.96	.88	.34	.37	.32	.25	.57	.49	.59	.47	.63	.76	.75	.44	.44	.49	.48	.46	.69	.72	.62
Producing	.93	.94	.92	.47	.51	.44	.42	.69	.62	.67	.53	.69	.80	.70	.58	.57	.53	.50	.54	.77	.79	.62
Reading	.93	.94	.94	.71	.69	.70	.55	.71	.62	.63	.60	.60	.70	.48	.71	.68	.63	.65	.65	.63	.65	.56
Decoding	.86	.85	.93	.78	.71	.73	.62	.61	.56	.70	.37	.65	.75	.55	.60	.61	.58	.43	.52	.72	.73	.52
LANGUAGE	.96	.97	.95	.70	.70	.68	.58	.67	.56	.65	.55	.72	.85	.75	.63	.62	.56	.59	.59	.78	.80	.65
Number & Op.	.86	.89	.93	.48	.55	.44	.49	.74	.60	.65	.67	.73	.85	.84	.74	.70	.72	.69	.70	.80	.83	.64
Concepts	.86	.88	.91	.58	.54	.48	.49	.81	.65	.66	.76	.66	.79	.79	.75	.71	.71	.78	.79	.79	.81	.61
Problems	.87	.88	.91	.60	.61	.54	.60	.63	.54	.47	.59	.67	.78	.82	.66	.62	.63	.61	.64	.81	.84	.60
MATH. REASONING	.90	.93	.96	.62	.63	.55	.59	.79	.65	.64	.74	.71	.83	.84	.79	.74	.75	.77	.79	.82	.85	.63
N =	62	45	121	51	51	51	51	45	45	45	45	89	89	89	45	45	45	45	45	159	159	70

TABLE 2

SURVEY OF BASIC COMPETENCIES
RESULTS OF CORRELATION STUDIES: EVIDENCE OF RELIABILITY AND VALIDITY

SUBTESTS	RELIABILITY			VALIDITY													Developmental Trait	
				SRA: ACH: Gr 2				WRAT: Grs 1-6			Teacher's Estimates					Mental Ability: Gr 4			
	Grade K	Grade 4	Grades 1-6	Composite	Reading	Language	Mathematics	Reading	Spelling	Arithmetic	General Ability	Language	Reading	Math. Computation	Math. Problems	Canadian Cognitive Abilities Test: Verbal	Canadian Cognitive Abilities Test: Non-Verbal	Cor. with Age	Cor. with Grade
Information Processing	.83	.73	.76	.60	.47	.52	.50	.49	.36	.48	.75	.76	.75	.76	.76	.44	.41	.82	.72
Language	.81	.76	.79	.59	.50	.52	.59	.50	.29	.29	.81	.80	.81	.81	.82	.49	.41	.80	.73
Reading	.86	.82	.91	.78	.69	.72	.59	.77	.60	.36	.84	.84	.85	.85	.86	.33	.44	.86	.73
Mathematics	.87	.75	.80	.52	.36	.40	.60	.54	.42	.59	.89	.89	.89	.89	.90	.29	.35	.88	.73
Composite	.89	.91	.93	.79	.66	.70	.71	.67	.48	.49	.90	.90	.90	.90	.91	.49	.57	.90	.90
N =	90	91	225	118	118	118	118	70	70	70	306	306	306	306	306	70	70	786	618
	Time Lapse: 3-4 weeks			Time Lapse: 4 months				Time Lapse: 12 months			Time Lapse: 1-2 weeks					Time Lapse: 2 months			

Table 3

TEST OF EARLY LEARNING SKILLS

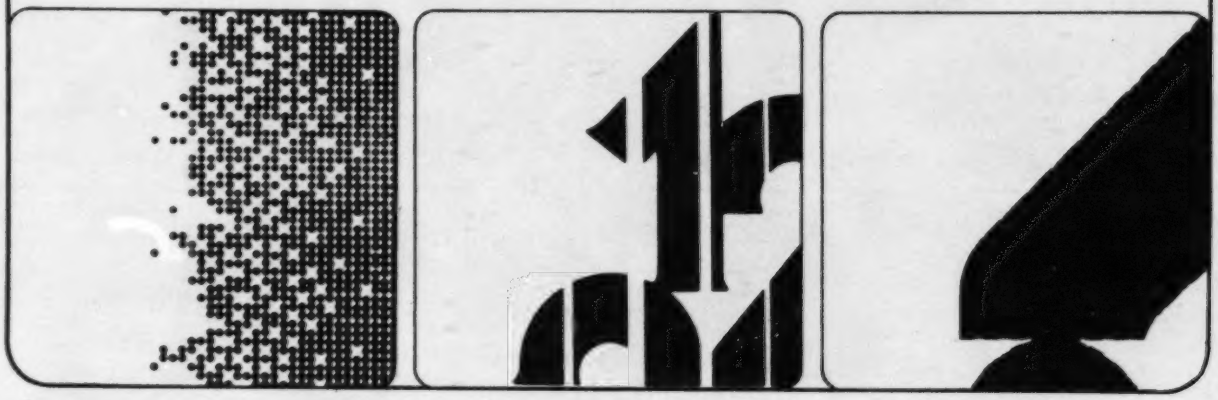
SUBTESTS	RELIABILITY (Test-Retest Correlation)	VALIDITY															DEVELOPMENTAL TRAIT
		Correl. with DIAL				Correl. with LAP(Original)						Correl. with LAP (Diag.)					
		Gross Motor	Fine Motor	Concepts	Communication	Gross Motor	Fine Motor	Social	Self-help	Cognitive	Language	Fine Motor	Language	Cognitive	Gross Motor	Self-help	Correlation with age
THINKING	.82	.40	.66	.72	.62	.63	.62	.63	.62	.82	.68	.69	.72	.75	.48	.46	.56
LANGUAGE	.83	.37	.40	.71	.63	.43	.46	.44	.56	.64	.65	.60	.72	.75	.66	.35	.49
NUMBER	.90	.51	.66	.80	.68	.65	.60	.66	.65	.86	.75	.61	.69	.76	.64	.34	.56
COMPOSITE	.93	.48	.65	.83	.71	.65	.64	.66	.68	.88	.78	.67	.80	.84	.66	.43	.58
N =	144	85	85	85	85	50	50	50	50	50	50	35	35	35	35	35	545
	Time Lapse = 1 month	Time Lapse = 8 months				Time Lapse = 3 months						Time Lapse = 9 months					

A TRAINING MANUAL

ASSESSMENT OF BASIC COMPETENCIES

Jwalla P. Somwaru, Ed.D.

ASSESSMENT OF BASIC COMPETENCIES SERIES
Published by: Scholastic Testing Service, Inc.



The *Assessment of Basic Competencies* is a battery of psychoeducational tests designed for the assessment of students who are not coping with learning in school. These tests have a developmental as well as a diagnostic focus. In a developmental mode a student is placed in each of eleven continuous scales which are important for learning in school; in a diagnostic mode a student's strengths and weaknesses are identified in terms of clusters of skills so that appropriate instructional intervention may be designed. The purpose of the assessment is to identify educational needs and not to classify students or predict school performance.

THE ASSESSMENT OF BASIC COMPETENCIES SERIES

Assessment of Basic Competencies
(A diagnostic battery for preschool to grade nine)

- Information Processing
  - Observing Skills
  - Organizing Skills
  - Relating Skills
- Language
  - Understanding Words
  - Comprehending Expressions
  - Producing Expressions
  - Reading for Meaning
  - Decoding Skills
- Mathematics
  - Knowing Number and Operations
  - Understanding Concepts
  - Solving Problems

A Manual for the Assessment of Basic Competencies

Survey of Basic Competencies
(A brief survey test for preschool to grade nine)

The Survey consists of four subtests:

- Information Processing Skills
- Language Skills
- Reading Skills
- Mathematics Skills

A Manual for the Survey of Basic Competencies

Test of Early Learning Skills
(A brief test for preschool)

This test consists of three subtests:

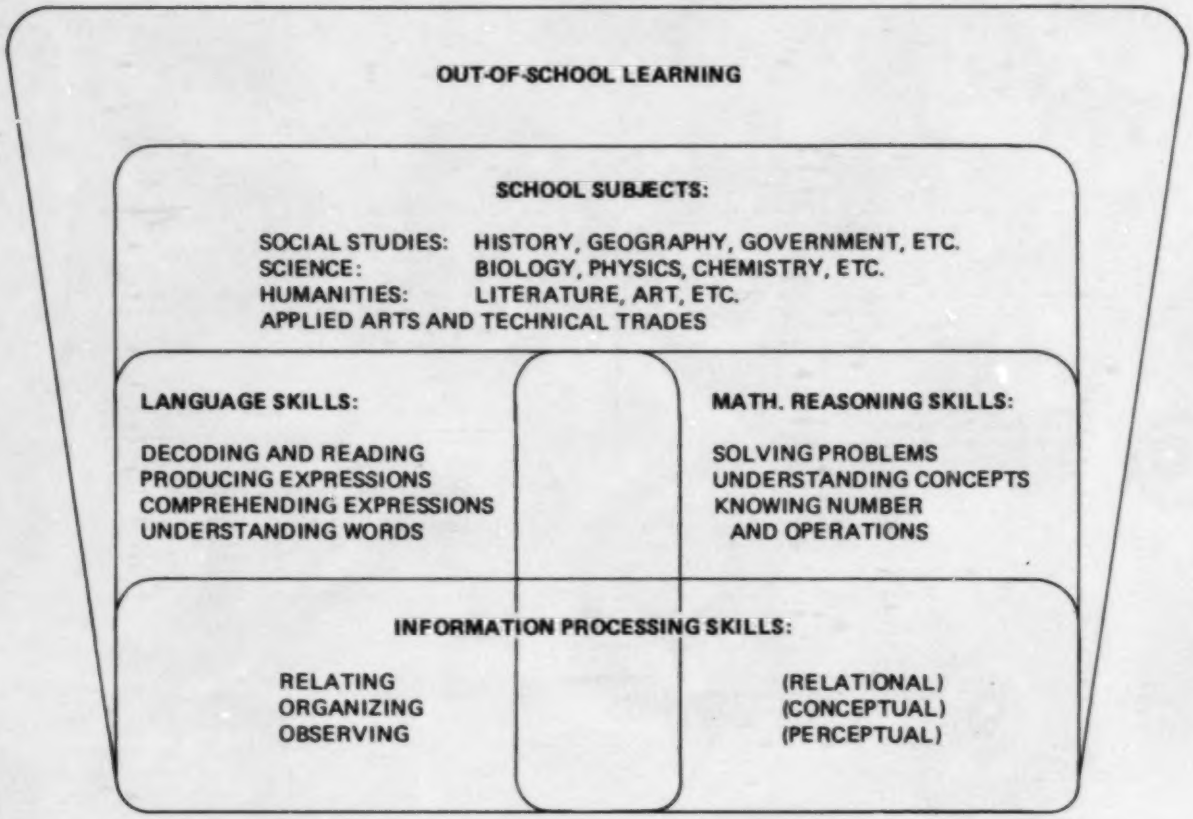
- Thinking Skills
- Language Skills
- Number Skills

A Manual for the Test of Early Learning Skills

The Assessment is the diagnostic component of a series which includes the *Survey of Basic Competencies* and the *Test of Early Learning Skills.* This presentation will focus on the Assessment, that is to say, the eleven tests in the three domains of Information Processing, Language, and Mathematics. There are separate training packages for the Survey, which is an abbreviated test, and the Test of Early Learning Skills, which is designed for preschool and kindergarten. This integrated series has been designed as an alternative to a variety of intelligence, aptitude, and achievement tests.

Published by: Scholastic Testing Service, Inc., 480 Meyer Rd., Bensenville, Illinois 60106
Copyright © 1981 by Jwalla P. Somwaru
Printed in the United States of America.

MODEL FOR THE ASSESSMENT OF BASIC COMPETENCIES



The Assessment series is based on a cumulative learning model. This model, which was conceptualized by Gagne, posits that simple associative learnings lead to more complex learnings in the form of concepts and generalizations. A child learns in the process of interaction with the environment, and acquires skills for processing information, language, and mathematics. Information-processing skills are necessary tools for all other learning, language is important for communication and social development, and mathematics skills and concepts are important for quantitative thinking. These three domains of skills interact and reinforce each other. They are used in the learning of other school subjects, as well as in learning out of school; in fact, they are enabling skills for all cognitive learning.

DEFINITION OF BASIC COMPETENCIES

LANGUAGE SKILLS

READING:
- Literal and inferential comprehension-detail, main idea, sequence, cause-effect.

DECODING:
- Knowing letters and sounds, discriminating between sounds, recognizing and pronouncing words.

COMPREHENDING AND PRODUCING EXPRESSIONS:
- Using nouns, adjectives, adverbs, pronouns.
- Using verbs, auxiliary, modal, link verb.
- Using function words – prepositions, determiners, conjunctions, qualifiers, etc.
- Understanding sentence structure.
- Transforming sentences.
- Knowing usage and idioms.

UNDERSTANDING WORDS:
- Words for objects, descriptions, actions, categories, and abstract ideas.

MATH. REASONING SKILLS

SOLVING PROBLEMS:
- Solving problems involving various applications in 1, 2, or 3 steps.

UNDERSTANDING CONCEPTS:
- Sets and relations.
- Number sentences and symbolic expressions.
- Units of measurement – English and metric.
- Units of money and combinations.
- Geometry and graphs.

KNOWING NUMBER AND OPERATIONS:
- Number and numeration.
- Order.
- Four operations with whole numbers, common and decimal fractions.
- Conservation of number.

INFORMATION PROCESSING SKILLS

RELATING:
- Identifying incongruent relations, inferring rules, completing analogies, solving combinations, making transitive inference, solving problems.

ORGANIZING:
- Excluding from class, including in class, relating classes, ordering in sequence.

OBSERVING:
- Comparing for similarity or difference, seeing and remembering, completing patterns, visualizing figures after rotation, integrating eye-hand activity, finding figure in background, conserving mass, length, weight, volume.

In this figure the basic competencies assessed in the three domains are defined. Information Processing is divided into three test areas: Observing, Organizing, and Relating and the content of each test area is defined in terms of clusters of skills. Each cluster is tested by several items. Language is divided into five test areas: Understanding Words, Comprehending Expressions, Producing Expressions, Decoding, and Reading. Mathematics is divided into three test areas: Knowing Number and Operations, Understanding Concepts, and Solving Problems.

Note the clusters of skills in each test area in your hand-out. These clusters of skills are suggested as units for diagnosis and instruction. If these skills are considered important for acquiring learning in school, then the test battery is valid for assessing them and the assessment is non-discriminatory.

TEST: INFORMATION PROCESSING: OBSERVING SKILLS

Clusters of Skills

1. Comparing for similarity
2. Seeing and remembering (short-term memory)
3. Completing patterns
4. Visualizing figures after rotation
5. Integrating eye-hand activity
6. Identifying figures in a background
7. Conserving mass, volume, weight, and length

EXAMPLE OF AN OBSERVING SKILLS TEST ITEM

(The student is first shown a page containing only picture A. That page is then turned over.)

Which picture did you see on the last page?

A B C

Information Processing: Observing
Seeing and Remembering

This transparency and the ten which follow it list the clusters of skills assessed in each test and give examples of some of the types of items used. These examples are very simple; the items increase in difficulty as we go up each scale. In this test, Observing Skills, one hundred items are distributed over these seven clusters of skills: *(Read clusters given above.)*. This is an example of an item in cluster 2. A student points to a picture or does something with an object for an answer; no verbalization is necessary. These thinking skills are used in most learning operations in and out of school. Seven of the tests are designed for Ages 3 to 15, while four are designed to start at Age 5 or kindergarten.

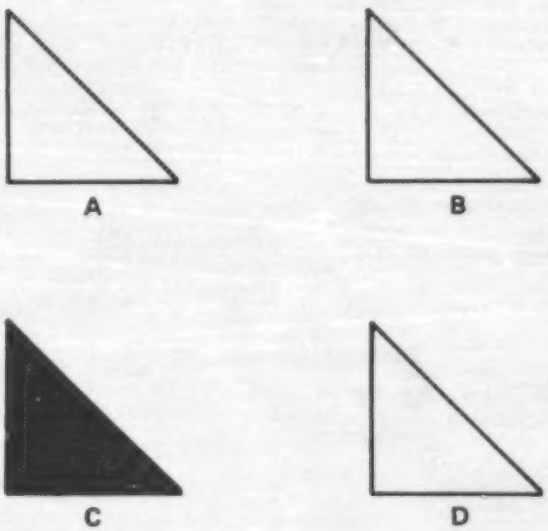
TEST: INFORMATION PROCESSING: ORGANIZING SKILLS

Clusters of Skills

1. Excluding from a class
2. Including in a class
3. Relating classes
4. Ordering in sequence

EXAMPLE OF AN ORGANIZING SKILLS TEST ITEM

Three of these are alike in some way. Which one is not like them?



Information Processing: Organizing
Excluding from a class

The one hundred items in Organizing Skills are distributed over these four clusters of skills: *(Read clusters given above.)*. This is an example of an item in cluster 1. Again, students give an answer by pointing to a picture. These skills in classifying and ordering are fundamental for conceptual thinking. We usually organize information in terms of classes or sequence in order to think and communicate more economically and effectively. These skills correspond with Piaget's processes of classifying and ordering in terms of spatio-temporal relations. Other tests include, but are not limited to, Piagetian constructs.

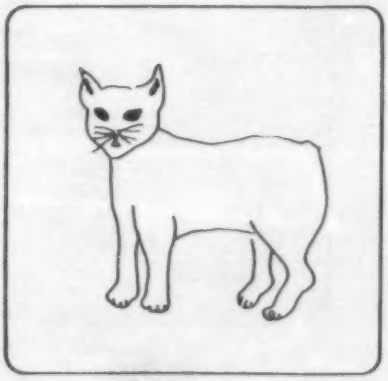
TEST: INFORMATION PROCESSING: RELATING SKILLS

Clusters of Skills

1. Identifying incongruent relations
2. Inferring rules
3. Completing analogies
4. Solving combinations
5. Making transitive inferences
6. Solving novel problems

EXAMPLE OF A RELATING SKILLS TEST ITEM

Look at this picture of a cat.
What is wrong with it?



Information Processing: Relating
Identifying an incongruent relation

The test in Relating Skills assesses competence in these six clusters: *(Read clusters given above.)*. At this level a child relates elements and concepts in reasoning processes in order to solve problems.

It will be observed that the competencies assessed in the three tests in Information Processing represent learned behaviors. They are strategies which children need in order to carry out further learning effectively. It is believed that they can be developed by systematic programming and instruction where they are lacking. Weikart's Cognitively Oriented Curriculum is one example of a systematic program directed towards developing these skills. The manual for the Assessment battery suggests some ways for developing these skills and lists several instructional resources.

TEST: LANGUAGE: UNDERSTANDING WORDS

Clusters of Skills

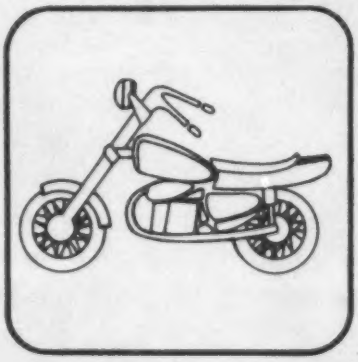
1. Words for objects
2. Words for actions
3. Words for descriptions
4. Words for categories
5. Words for ideas

EXAMPLE OF AN UNDERSTANDING WORDS TEST ITEM

Which picture shows an animal?
Point to it:

A

B



C

1. Language: Understanding Words
   Understanding the word for a category

Learning words is the first step in the learning of a language. It is estimated that lexical words carry about eighty percent of the meaning in our communication. In this test the words are grouped into the following clusters: *(Read clusters given above.)*. The test administrator reads a word and presents the child with a page which contains three or four pictures. The child is asked to point to the picture which shows the meaning of this word. You would observe that the clusters start with labels for objects and proceed through more and more abstract groupings, ending with words for ideas. The words selected are in common usage and the purpose of the test is to assess precision in knowledge and use.

TEST: LANGUAGE: COMPREHENDING EXPRESSIONS

Clusters of Skills

1. Understanding use of nouns, adjectives, and adverbs
2. Understanding use of pronouns
3. Understanding use of verbs: auxiliary, modal, and copula
4. Understanding use of function words: prepositions, conjunctions, determiners, qualifiers, and modifiers
5. Understanding sentence structure: simple, compound, and complex
6. Understanding transformation of sentences: passive, interrogative, etc.
7. Knowing idioms and special usage

EXAMPLE OF A COMPREHENDING EXPRESSIONS TEST ITEM

The box is on the table.
Which picture shows this?

A B C

Language: Comprehending Expressions
Understanding use of preposition

In this test we are assessing competence in receptive oral language. The one hundred items are grouped into the following clusters: *(Read clusters given above.)*.The example illustrates the method used. The child is presented with an expression orally, and he or she is asked to point to the picture which shows this. The child does not have to read or produce an oral expression. Of course, it is recognized that some facility in English is necessary for understanding the instructions and the items; in testing children with limited English the test would assess competence in the basic level of communication, as well as understanding of specific linguistic structures.

TEST: LANGUAGE: PRODUCING EXPRESSIONS

Clusters of Skills

1. Using nouns, adjectives, and adverbs
2. Using pronouns
3. Using verbs: auxiliary, modal, and copula
4. Using function words: prepositions, conjunctions, determiners, qualifiers, and modifiers
5. Constructing sentences: simple, compound, and complex
6. Transforming sentences: passive, interrogative, etc.

EXAMPLE OF A PRODUCING EXPRESSIONS TEST ITEM

Sandra has a pretty shirt. Tell me whose shirt is pretty:

_____ **shirt is pretty.**
(whose)

32. Language: Producing Expressions
Using possessive case

Although the clusters of skills in this test are similar to the clusters for Comprehending Expressions, the nature of the tasks is different. The child is expected to produce expressions orally as requested. The test administrator presents pictorial and verbal stimuli, and requests the child to produce expressions to complete sentences, construct sentences, or ask questions. It is known that the comprehension of a linguistic structure, such as verb tense, generally precedes its production, and for this reason the two aspects of comprehension and production are tested separately.

TEST: LANGUAGE: READING

Clusters of Skills

1. Matching a word, phrase, or sentence with a picture
2. Interpreting words in context
3. Literal comprehension: Finding significant detail
4. Literal comprehension: Finding sequence
5. Literal comprehension: Finding cause and effect
6. Literal comprehension: Finding the main idea
7. Inferential comprehension: Inferring significant detail
8. Inferential comprehension: Inferring cause and effect
9. Inferential comprehension: Inferring the main idea

EXAMPLE OF A READING TEST ITEM

Read this passage to yourself and then answer the question.

Jim had been happy with his old bike until his two friends got new ones. Paul and Bill raced all over the town with their new bikes. They kept blowing their noisy horns so that people would look at them.

Jim felt

A. angry.

B. unhappy.

C. funny.

D. proud.

47. Language: Reading
Inferring effect

This test is designed for use from Kindergarten through Grade 9. It contains eighty-five items which are distributed among the following clusters: *(Read clusters given above.)*. The first two clusters assess those skills which are developed in Kindergarten and Grade 1 programs. The other clusters include skills which are tested in both the literal and inferential dimensions. As can be seen in the illustration, the format is similar to that used in some other tests of comprehension. The test administrator reads the directions for the item, and the student reads the item for himself or herself and does what is required.

TEST: LANGUAGE: DECODING

Clusters of Skills

1. Identifying letters and words with sounds
2. Recognizing phonic words
3. Discriminating sounds and whole words
4. Recognizing synthetic words
5. Discriminating visual symbols
6. Pronouncing names and sounds of letters
7. Pronouncing basic words at sight
8. Pronouncing phonic words
9. Pronouncing synthetic words

EXAMPLE OF A DECODING TEST ITEM

Point to a group of words exactly like this. *(Point to group on left.)*

	up the hill
up the hill	**on the hill**
	up the hip

21. Language: Decoding
    Discriminating visual symbols

The test in decoding skills is also designed for use in Kindergarten through Grade 9. The eighty-five items are distributed among the following clusters of skills: *(Read clusters given above.)*. Both recognition and pronounciation skills are assessed. While several basic words are learned at sight, the learning and use of phonetic decoding skills are vital for reading. This statement should not minimize the importance of language development for reading: decoding is a necessary although not sufficient condition for reading.

TEST: MATHEMATICS: KNOWING NUMBER AND OPERATIONS

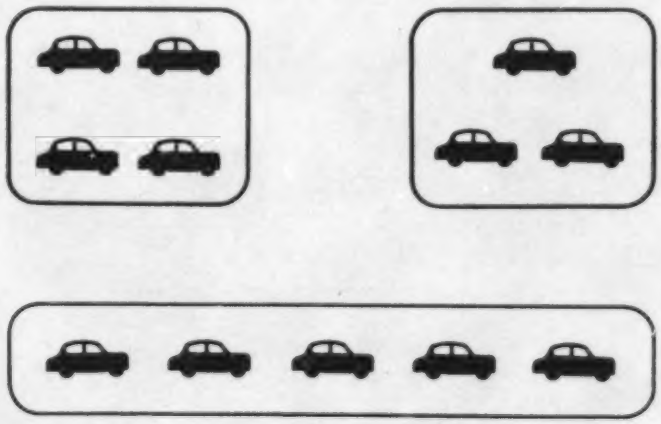
Clusters of Skills

1. Counting and comparing sets
2. Number system, number line, numeration, rounding
3. Adding whole numbers
4. Subtracting whole numbers
5. Multiplying whole numbers
6. Dividing whole numbers
7. Performing operations with common fractions
8. Performing operations with decimal fractions
9. Performing operations without number – using math sticks of varying lengths
10. Performing operations with integers and brackets
11. Simplifying exponents and finding square root
12. Demonstrating conservation of number

EXAMPLE OF A KNOWING NUMBER AND OPERATIONS TEST ITEM

Which set shows this number of cars? *(Point, but do not say "5".)*

5



15. Math: Knowing Number and Operations
    Matching a numeral with a number

These basic skills form a foundation for successful learning in mathematics. The one hundred items which make up the test are grouped into the following clusters: *(Read clusters given above.)*. The test concentrates on numeracy: the knowledge of number, numeration, and basic operations with whole numbers. Failure to learn these essentials often results in the hazy learning of mathematics throughout school and is reflected in the student's inability to learn concepts and solve problems. Pencil and paper must be supplied to the student for use in computation.

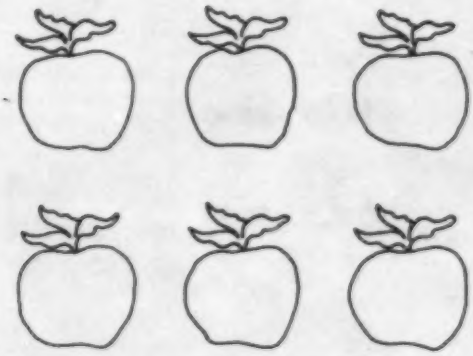
TEST: MATHEMATICS: UNDERSTANDING CONCEPTS

Clusters of Skills

1. Understanding sets and their relations
2. Interpreting number sentences and symbolic expressions
3. Understanding form and meaning of common fractions
4. Understanding form and meaning of decimal fractions
5. Recognizing instruments of measurement and understanding units of measurement – customary and metric
6. Understanding properties of geometric figures, area, and volume; interpreting graphs
7. Understanding value of units of money and their relationships
8. Understanding miscellaneous concepts: square root, etc.

EXAMPLE OF AN UNDERSTANDING CONCEPTS TEST ITEM

How many are one-half of these apples?



44. Math: Understanding Concepts
Finding half of a number

With a foundation in the number system, a student learns concepts. These concepts bring generality into the specifics that the child has learned. The eighty-five items in this test are grouped into the following clusters of skills: *(Read clusters given above.)*. They are designed for assessment in Kindergarten through Grade 9. In general, the test administrator reads the questions while the student follows and looks at the pictures used for illustration. While most of the operations may be carried out by the student mentally, pencil and paper should be provided as some students may wish to use them.

TEST: MATHEMATICS: SOLVING PROBLEMS

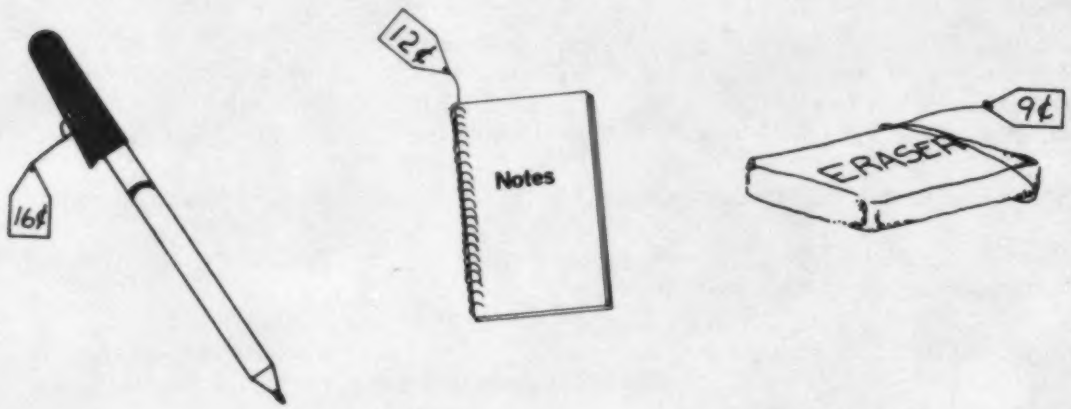
Clusters of Skills

1. Solving one-step problems involving addition and subtraction
2. Solving one-step problems involving multiplication and division
3. Solving two- and three-step problems involving more than one operation
4. Solving problems involving applications of various units of measurement
5. Analyzing problems
6. Solving problems involving fractions and decimals
7. Solving problems involving ratio and percent

EXAMPLE OF A SOLVING PROBLEMS TEST ITEM

Follow while I read this problem:

If you go to the store with a quarter (25 cents), which two things can you buy and have no change left?



42. Math: Solving Problems
Finding addends to make twenty-five

A student uses knowledge of number and operations, as well as understanding of concepts, in the solution of problems. The problems are of a practical nature and attempt to assess the student's ability to select and apply skills and concepts. The test is designed for use in Kindergarten through Grade 9, and the eighty-five items are grouped into the following clusters of skills: *(Read clusters given above.)*. As in the previous test, the student may be able to carry out the computations required mentally, but pencil and paper must be supplied as some students may wish to use these materials.

Directions for the Test Administrator

1. Record the data required on the separate Response Form and calculate the student's age. Determine appropriate starting points and record them. (See direction number fourteen.)

2. Seat the student on the opposite side of a small table, as illustrated in the picture.

3. Open the test booklet and lay it flat on the table so that you can read the directions on your side and yet be able to observe the student responding to the pictures on his or her side.

4. Gather the objects you will need. All objects, except pencil and paper, have been included in the test package.

5. Read the statement and/or question given at the top of the administrator's page and do as directed. What you are to say is printed in **bold** type, and what you are to do is printed in *italic* type. When you are instructed in *italic* type to point to a picture or shape, always point to the student's side of the test booklet.

6. Let the student respond by pointing to a picture, by giving an oral answer, by doing something with objects, or by writing or drawing. (It is acceptable for the sudent to point to a picture, or to identify an answer by its letter designation A, B, C, or D, unless the question requires verbalization.)

   The answer to each item appears on the *following* administrator's page in a box to the right.

7. Compare the student's response with the one given in the box and enter "1" for correct or "0" for incorrect for each item on the Response Form.

8. In general, repeat a question one more time if you feel that the student did not hear the question or instruction clearly or did not pay adequate attention. Do not repeat the question every time the student gives an incorrect response.

9. Start testing at one of the starting points given in the chart below for each grade. Grade is used here to mean the grade level at which you know or believe the student is working, and this is not necessarily the one in which he or she is enrolled. *(This point is further clarified in the manual.)*

   If the student gets the first item correct, proceed testing forward until the student gets five consecutive items incorrect, or reaches the end of the test. The first item incorrect of the five consecutive errors is called the Ceiling item.

These directions are printed in front of each test book; they are reproduced in the Manual for convenience and easy reference. Each test has specific directions for starting and a different set of starting points. The directions and starting points for Information Processing: Observing Skills are used here for illustration.

Let us go over these directions in detail. *(Read them.)*

Directions for the Test Administrator (cont.)

If the student failed the first item given, or did not pass five items consecutively, test backward until five consecutive items are passed, or the first item of the test is reached. The highest of five consecutive items correct before the first error is called the Basal item.

Enter the Basal and Ceiling items on the Response Form. The distance between these two points constitutes the Operating Range of the student.

10. Find the raw score for the test by subtracting the number of errors from the highest item correct. Enter this score in the space provided. Alternatively, the raw score may be found by adding the number correct above the Basal to the Basal item.

11. At the conclusion of the test transcribe the raw scores onto the cover page of the Response Form, and refer to the Assessment Manual for conversion of the scores into Levels of Competence and normative measures.

12. If you are asked whether or not an answer is correct, answer yes or no in an honest and straightforward manner. If the answer is no, you should add "but that was a good try" or "keep trying." You should never give the correct answer to a question. If you are asked, say, "I'm sorry, that's against the rules."

13. This is not a speed test, and you should give reasonable time for answering each item.

14. Starting Points for this test:

Grade	Starting Point	Grade	Starting Point
K	16	5	60
1	34	6	62
2	41	7	68
3	49	8	72
4	55	9	72

Start all students Age 3+ and 4+ years at the first item in the test.

15. Directions for starting the test:

Read the following instructions to the student:

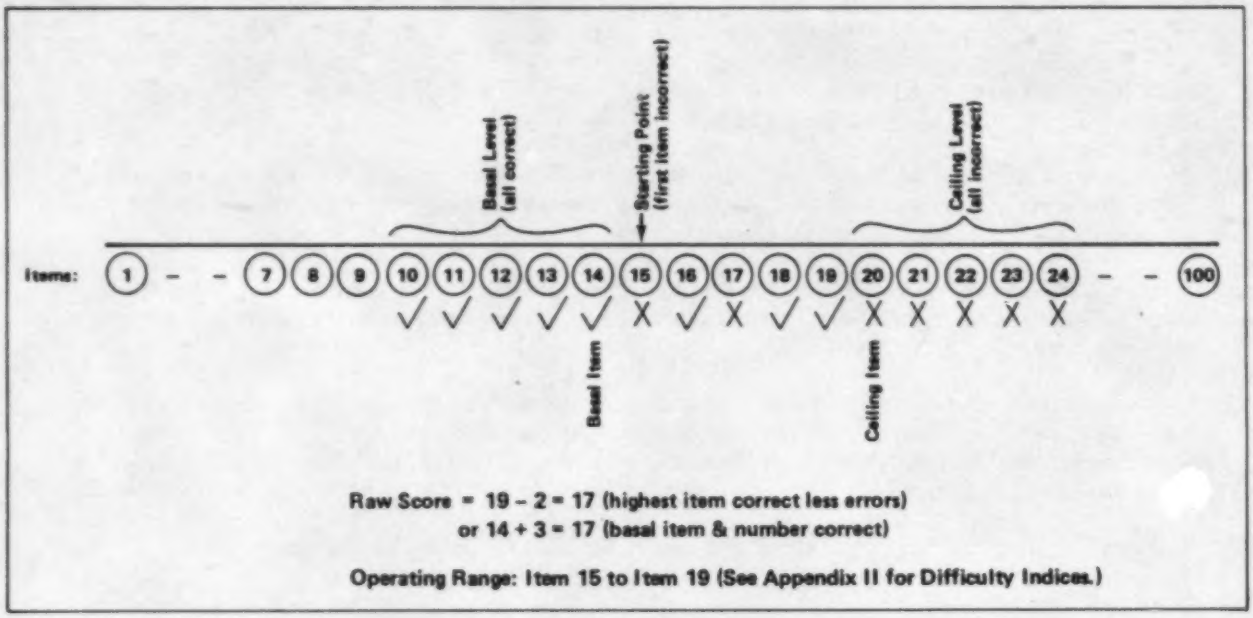
In this book we are going to look at sets of pictures and try to find the correct one. Sometimes you will make shapes and figures. Listen carefully and try your best, but if you do not know the answer to a question, say, "I don't know," and do not guess.

Use this to point to the picture. *(Give the student the pointer that is included in your carrying case.)*

Are you ready? *(Pause.)* **Let's begin.**

(Continue reading directions.)

Illustration for Using Basal and Ceiling Rules
(Example: Starting at Item 15)


Basal Level (all correct)
Starting Point (first item incorrect)
Ceiling Level (all incorrect)
Items:
1 – – 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 – – 100
✓ ✓ ✓ ✓ ✓ X ✓ X ✓ ✓ X X X X X
Basal Item
Ceiling Item
Raw Score = 19 – 2 = 17 (highest item correct less errors)
or 14 + 3 = 17 (basal item & number correct)
Operating Range: Item 15 to Item 19 (See Appendix II for Difficulty Indices.)

Let us look at this illustration for using basal and ceiling rules.

While it is possible to start any student at the beginning of a test, and to proceed up to the end of the test, this procedure is wasteful of time and energy. It is therefore suggested that one should follow the rules given in the test manual for starting and determining a basal and a ceiling item. In this illustration the test administrator starts at Item 15. Since the item is not passed, the administrator tests backward until five consecutive items are passed (Items 14 to 10). Testing is then resumed forward at Item 16 and proceeds until five consecutive items are answered incorrectly (Items 20 to 24). The raw score is then determined by either subtracting the two errors between the basal and the ceiling from the highest item correct (Item 19) or by adding the number correct between the basal and ceiling to the basal item (Item 14). The operating range lies between the basal and ceiling item: Items 15 to 19. The Difficulty Indices for all items are given in Appendix II of the Assessment Manual.

Starting Points for Various Tests
(Given as Item Numbers)

TESTS	AGE		GRADE									
	3+	4+	K	1	2	3	4	5	6	7	8	9
INFORMATION PROCESSING:												
Observing	1	1	16	34	41	49	55	60	62	68	72	72
Organizing	1	1	11	23	33	38	48	52	53	55	57	57
Relating	1	1	17	37	43	52	58	64	66	67	69	69
LANGUAGE :												
Understanding Words	1	1	20	29	44	51	64	72	76	80	84	84
Comprehending	1	1	9	24	33	45	47	49	52	55	58	58
Producing	1	1	21	38	54	59	67	70	72	75	77	77
Reading			16	26	39	46	53	57	60	62	64	64
Decoding			16	37	58	72	83	86	86	86	86	86
MATHEMATICS:												
Number & Operations	1	1	17	29	44	53	60	68	72	76	81	81
Concepts			16	31	42	49	61	70	73	74	76	76
Solving Problems			16	31	34	42	54	61	68	74	77	77

This table, which is reproduced from the Manual, gives the starting point that is suggested for each test by age and grade. After determining the age or grade level at which the student is enrolled or functioning, it is suggested that the column of starting points be copied onto the front cover of the response form, where space is provided. These starting points would be needed for entering the tables to convert raw scores into levels of competence.

(This presentation continues on side 2 of the cassette tape.)

Summary of Steps in Using Conversion Tables

1. Determine the raw score for each test by using one of these two methods:

   (a) Note the index number of the highest item correct, and subtract the number of incorrect responses between the basal and ceiling from it.

   (b) Note the index number of the basal item, and add the number of correct responses between the basal and ceiling to it.

   Transcribe the raw scores onto the front cover of the Response Form.

2. Note the raw score and the starting point for each test and use the appropriate table (Tables 2 to 12) to convert the raw score into a Level of Competence. This Level of Competence is printed in a shaded area in the middle column; the lower and upper confidence limits are printed to the left and to the right of the Level of Competence. Transcribe these three values to the appropriate spaces provided on the front cover of the Response Form.

3. Convert the Level of Competence for each test into a Developmental Age and/or Grade Equivalent by referring to the appropriate table (Tables 13 to 23).

4. Convert a Level of Competence into a percentile rank (by age group) by referring to Tables 24 to 34.

5. In a similar manner, convert the Level of Competence into a percentile rank (by grade) for spring testing by referring to Tables 35 to 45, and to Tables 46 to 56 for fall testing.

6. Convert a percentile rank from any test into a standard score (with mean = 50, and S.D. = 10) or into a Normal Curve Equivalent, such as is used in Title I assessment for the U.S. Office of Education, by using Table 57.

There are six steps that one would need to go through in order to convert raw scores into various derived scores. These steps are illustrated in the pages which follow. Let us go over them. (*Read steps 1-6.*)

Conversion of Raw Score into Level of Competence, with Confidence Limits

TEST: INFORMATION PROCESSING: RELATING SKILLS

	Starting Pt. 1 (A 3 & 4)			Starting Pt. 18 (K)			Starting Pt. 36 (Gr. 1)			Starting Pt. 45 (Gr. 2)			Starting Pt. 52 (Gr. 3)			Starting Pt. 57 (Gr. 4)			Starting Pt. 62 (Gr. 5)			Starting Pt. 65 (Gr. 6)			Starting Pt. 66 (Gr. 7)			Starting Pt. 66 (Gr. 8+)		
Raw Score	Lower Limit	Level of Comp.	Upper Limit	Lower Limit	Level of Comp.	Upper Limit	Lower Limit	Level of Comp.	Upper Limit	Lower Limit	Level of Comp.	Upper Limit	Lower Limit	Level of Comp.	Upper Limit	Lower Limit	Level of Comp.	Upper Limit	Lower Limit	Level of Comp.	Upper Limit	Lower Limit	Level of Comp.	Upper Limit	Lower Limit	Level of Comp.	Upper Limit	Lower Limit	Level of Comp.	Upper Limit
1	50	83	91																									
2	57	70	96																									
3	63	75	100																									
4	69	80	104																									
5	74	84	107	64	78	97																						
6	79	89	109	70	84	102																						
7	83	92	110	75	88	105																						
8	87	95	113	80	92	108																						
9	90	98	115	84	95	111																						
10	92	100	116	87	98	113																						
11	95	102	117	90	100	115	81	93	107																			
12	97	105	119	93	103	117	85	96	110																			
13	99	107	120	95	105	118	88	99	112																			
14	100	108	121	97	108	120	91	102	114																			
15	102	110	122	100	108	121	94	104	117	90	101	113																
16	103	112	124	101	110	122	97	106	118	93	104	115																
17	104	113	125	103	111	124	99	108	120	95	106	117	93	104	115													
18	106	115	127	105	113	125	101	110	122	98	107	119	95	106	117													
19	107	117	128	106	115	126	103	112	123	100	109	121	97	108	118	96	107	117										
20	109	118	129	108	117	128	105	114	125	102	111	122	99	109	120	98	109	119										
21	110	119	131	109	118	129	106	115	126	104	113	124	101	111	122	100	110	120										
22	112	121	132	111	120	130	108	117	127	105	115	125	103	113	123	102	112	122	100	111	121							
23	113	122	133	112	121	131	109	119	129	107	117	126	105	114	125	104	113	123	102	113	122							
24	114	123	134	113	123	133	111	120	130	109	118	128	107	116	126	106	115	125	104	114	123	104	114	123	104	114	122	104	114	122
25	116	125	136	114	124	134	112	121	131	110	119	129	109	118	127	108	117	126	106	116	125	106	116	124	106	116	124	106	116	124
26	117	126	137	116	125	135	113	122	132	112	120	130	110	119	129	109	118	127	108	117	126	108	117	125	108	117	125	108	117	125
27	118	128	138	117	126	136	114	123	134	113	121	132	112	120	130	111	119	129	110	119	127	110	119	127	110	119	127	110	119	127
28	119	129	139	118	128	138	116	124	135	114	123	133	113	121	131	112	121	130	111	120	129	111	120	128	111	120	128	111	120	128
29	120	131	140	119	129	139	117	125	136	116	124	134	114	122	133	113	122	131	112	121	130	112	121	129	112	121	129	112	121	129
30	121	132	142	120	130	140	118	126	137	117	125	135	116	123	134	115	123	132	114	122	131	113	122	131	113	122	130	113	122	130

This is a reproduction of part of a table for the conversion of a raw score into a Level of Competence for the test Observing Skills in Information Processing. The child's raw score is located in the left-most column, for example, 16. This is followed across to the column for starting point 36 for Grade 1. The Level of Competence is found at the coordinate; in this case it is 106. To the left of this number is the lower confidence limit of 97, while to the right is the upper confidence limit of 118. A person's Level of Competence is likely to fall within these confidence limits at least seventy-five percent of the time if he or she is tested repeatedly with parallel sets of items.

Conversion of Level of Competence into Developmental Age and Grade Equivalent

TEST: INFORMATION PROCESSING: OBSERVING SKILLS

Level of Comp.	D.A. (months)	G.E.	Level of Comp.	D.A. (months)	G.E.	Level of Comp.	D.A. (months)	G.E.
<81	<36	<A-3.0						
81	36	A-3.0	121	57	A-4.9	161	90	2.2
82	36	A-3.0	122	58	A-4.9	162	91	2.3
83	37	A-3.1	123	59	K-0	163	92	2.4
84	37	A-3.1	124	59	K-0	164	94	2.5
85	37	A-3.1	125	60	K.1	165	95	2.6
86	38	A-3.2	126	61	K.1	166	96	2.7
87	38	A-3.2	127	61	K.1	167	98	2.8
88	38	A-3.2	128	62	K.2	168	99	3.0
89	39	A-3.3	129	63	K.2	169	100	3.1
90	39	A-3.3	130	63	K.3	170	102	3.2
91	39	A-3.3	131	64	K.3	171	104	3.4
92	40	A-3.4	132	65	K.4	172	105	3.5
93	40	A-3.4	133	66	K.4	173	107	3.7
94	41	A-3.5	134	66	K.5	174	109	3.8
95	41	A-3.5	135	67	K.5	175	111	4.0
96	42	A-3.6	136	68	K.6	176	113	4.2

The Level of Competence is a specially designed scale that is independent of time or norm groups. Its derivation is based on latent trait theory. Values on this scale can, however, be converted into either of these normative scales: Developmental Age – the age for which a Level of Competence is typical; and Grade Equivalent – the grade for which a Level of Competence is typical. In generating Grade Equivalents, all students are considered as having taken the same test even though they respond to different subsets of items. A latent-trait property of the scale enables us to estimate Level of Competence using different subsets of items.

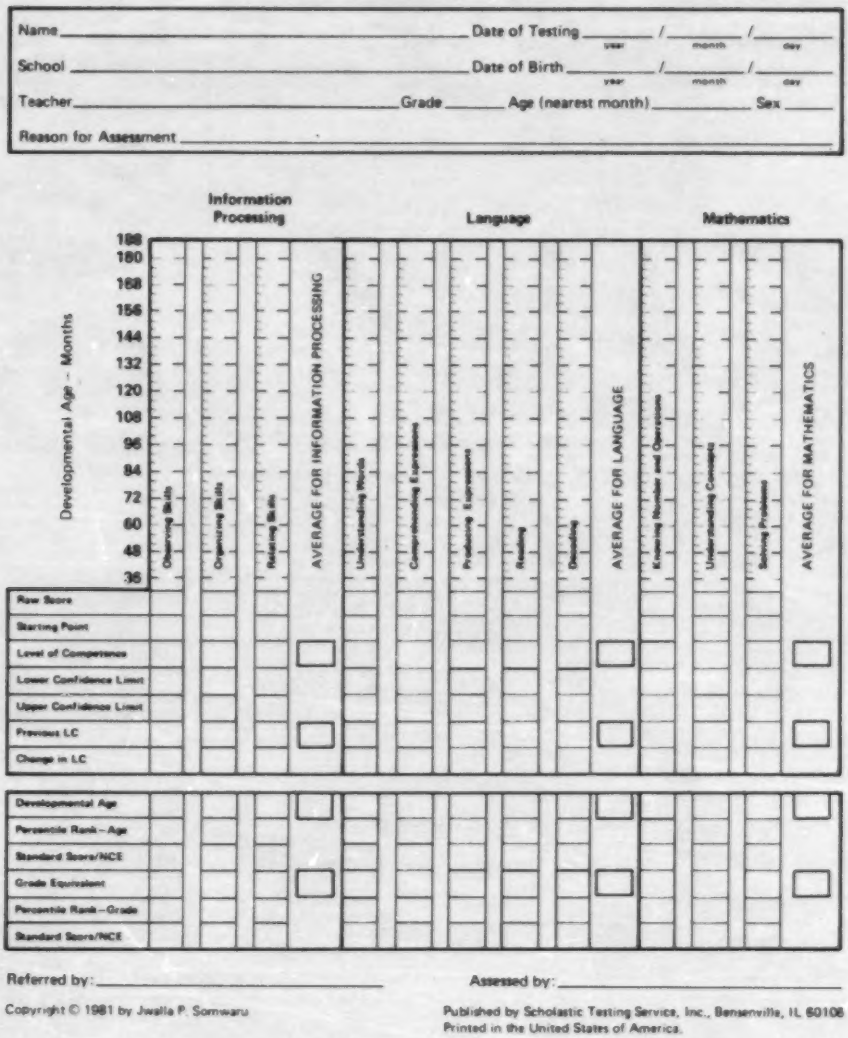
Conversion of Percentile Rank into Standard Score and Normal Curve Equivalent

Percentile Rank	Standard Score	Normal Curve Equivalent	Percentile Rank	Standard Score	Normal Curve Equivalent	Percentile Rank	Standard Score	Normal Curve Equivalent
1	27	1.0	34	46	41.3	67	54	59.3
2	29	6.7	35	46	41.9	68	55	59.9
3	31	10.4	36	46	42.5	69	55	60.4
4	32	13.1	37	47	43.0	70	55	61.0
5	34	15.4	38	47	43.6	71	56	61.7
6	34	17.3	39	47	44.1	72	56	62.3
7	35	18.9	40	47	44.7	73	56	62.9
8	36	20.4	41	48	45.2	74	56	63.5
9	37	21.8	42	48	45.8	75	57	64.2
10	37	23.0	43	48	46.3	76	57	64.9
11	38	24.2	44	48	46.8	77	57	65.6
12	38	25.3	45	49	47.4	78	58	66.3
13	39	26.3	46	49	47.9	79	58	67.0
14	39	27.2	47	49	48.4	80	58	67.7
15	40	28.2	48	49	48.9	81	59	68.5
16	40	29.1	49	50	49.5	82	59	69.3
17	40	29.9	50	50	50.0	83	60	70.1

Standard Score: Mean = 50, S.D. = 10

Normal Curve Equivalent (NCE): Mean = 50, S.D. = 21

This is a portion of the table for converting percentile ranks into standard scores (which have a mean of 50 and a standard deviation of 10). The table can be used to convert percentile ranks into Normal Curve Equivalents, which are also standard scores with a mean of 50 and a standard deviation of 21. The NCE is used in Title I Assessment.



ASSESSMENT OF BASIC COMPETENCIES

Response Form – Diagnostic Edition

Name _____ Date of Testing ____ / ____ / ____ (year / month / day)

School _____ Date of Birth ____ / ____ / ____ (year / month / day)

Teacher _____ Grade _____ Age (nearest month) _____ Sex _____

Reason for Assessment _____

Information Processing | Language | Mathematics

Developmental Age – Months: 180, 168, 156, 144, 132, 120, 108, 96, 84, 72, 60, 48, 36

Organizing Skills | Organizing Skills | Relating Skills | AVERAGE FOR INFORMATION PROCESSING | Understanding Words | Comprehending Expressions | Producing Expressions | Reading | Decoding | AVERAGE FOR LANGUAGE | Knowing Number and Operations | Understanding Concepts | Solving Problems | AVERAGE FOR MATHEMATICS

Raw Score
Starting Point
Level of Competence
Lower Confidence Limit
Upper Confidence Limit
Previous LC
Change in LC

Developmental Age
Percentile Rank – Age
Standard Score/NCE
Grade Equivalent
Percentile Rank – Grade
Standard Score/NCE

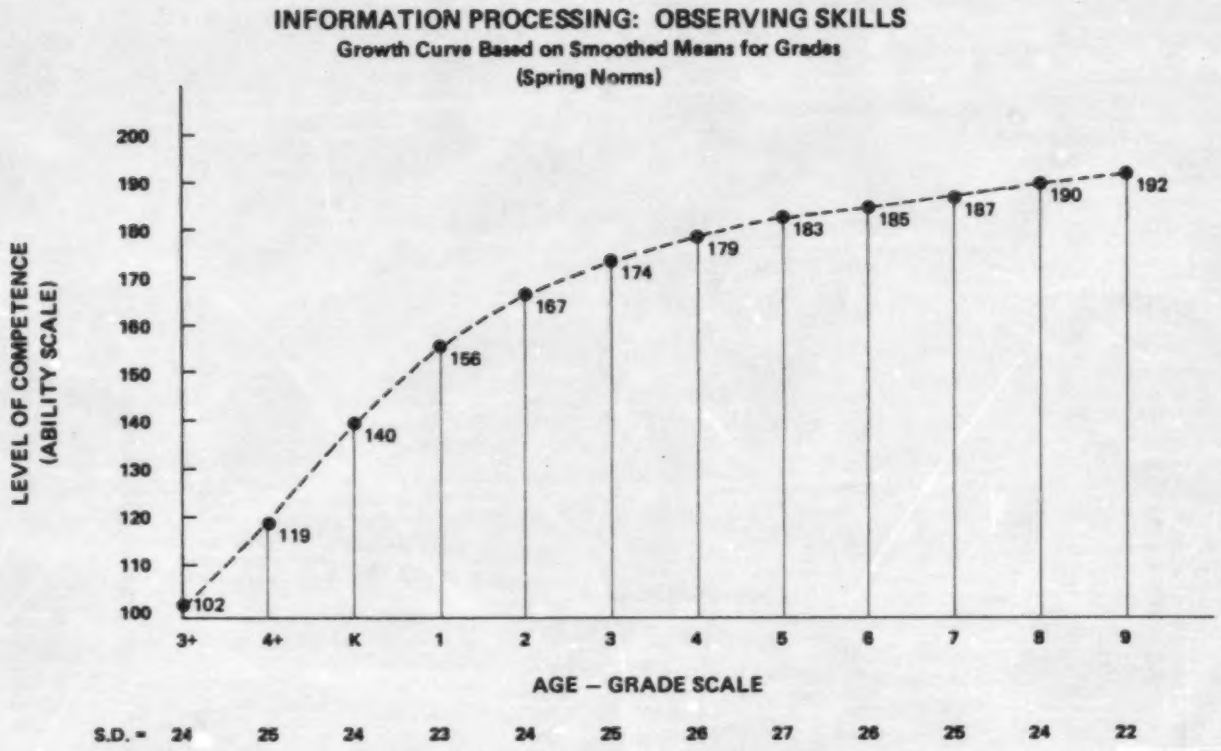
Referred by: _____ Assessed by: _____

Copyright © 1981 by Jwalla P. Somwaru

Published by Scholastic Testing Service, Inc., Bensenville, IL 60106
Printed in the United States of America.

This is a reproduction of the front cover of the Response Form. The format is the same for the Developmental and Diagnostic editions. It was designed for recording the various raw and derived scores, as well as for graphing the values for Developmental Age. The Developmental Age can be used for making comparisons across tests, as well as for evaluating intra-individual differences. A line can be drawn across the bars at the child's chronological age and performances above and below this line can be noted as strengths and weaknesses.

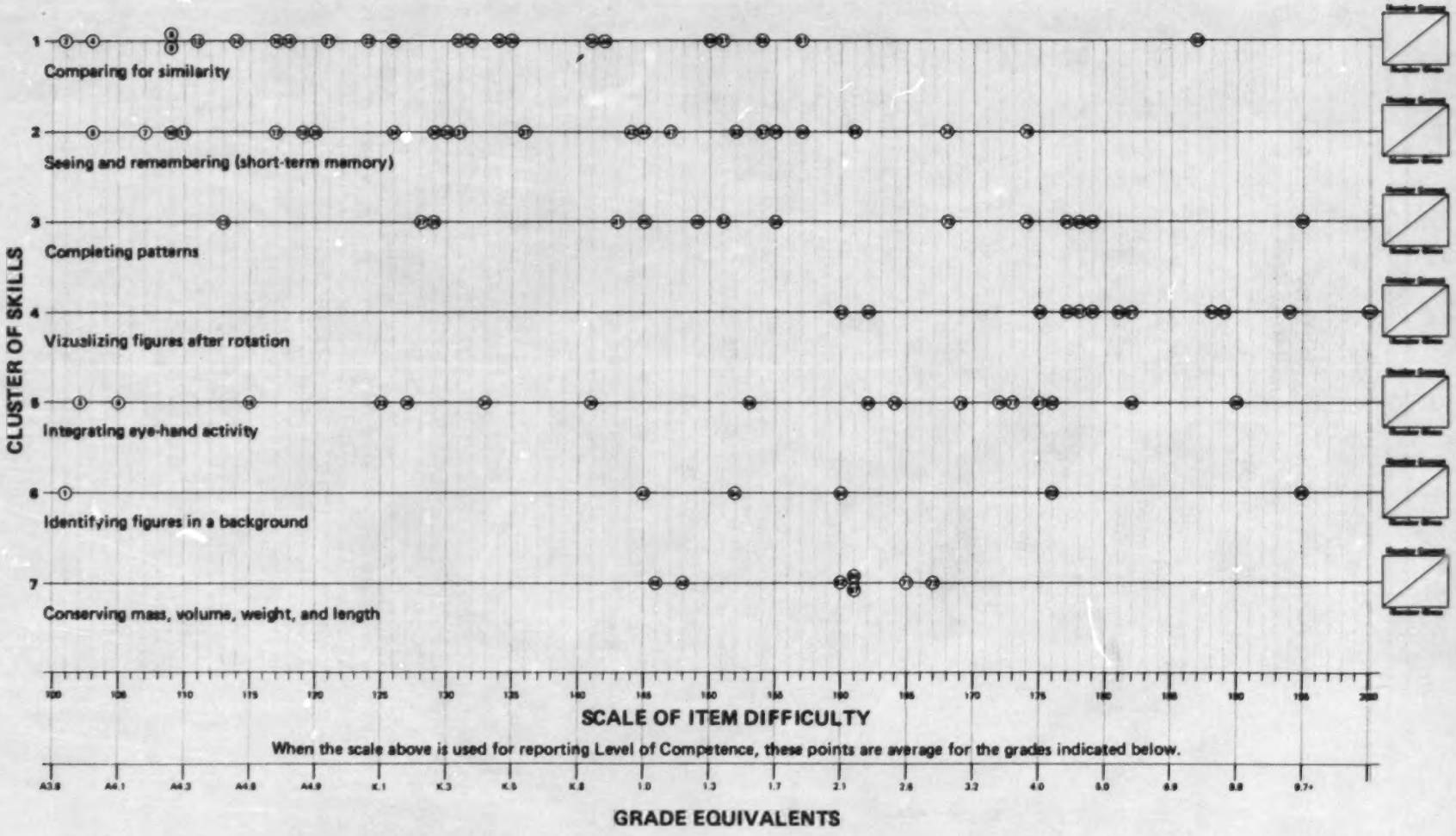
The Level of Competence, Developmental Age, and Grade Equivalent can be averaged for Information Processing, Language, and Mathematics if such global assessments are needed. The test battery has potential application in the assessment of learning disabilities and retardation as well as specific areas such as thinking skills, language development, reading, and mathematics.



This is an illustration of a growth curve for Observing Skills. One has been graphed for each test by age and grade. The horizontal axis indicates age or grade level, while the vertical axis indicates Level of Competence (or latent trait ability). The points in the graph represent means for the different age and grade groups. The shape of the curve suggests the rapid growth of the ability being measured during preschool, kindergarten, and Grade 1, a moderate increase through Grades 2 to 4, and a leveling out of growth from Grades 5 through 9. The Level of Competence represents points on this growth curve and is very appropriate for measuring growth over time from repeated testing, as the scale consists of equal-unit intervals across the entire range. As is to be expected, the curves for each test differ from each other. However, they are all anchored at points 140 and 190, these points representing the means for kindergarten and Grade 8 respectively.

ASSESSMENT OF BASIC COMPETENCIES: DIAGNOSTIC ANALYSIS

INFORMATION PROCESSING: OBSERVING SKILLS



BASAL ITEM_____ CEILING ITEM_____ NUMBER OF ERRORS_____ RAW SCORE ☐

There are two editions of the Response Form, a developmental and a diagnostic. This is an illustration of one page of the diagnostic edition. It shows the items grouped in clusters of skills, but still arranged in ascending order of difficulty. The number of items correct and the number of items given can be recorded for each cluster. At the end of the testing it is easy to observe strengths and weaknesses in each test area, and to plan an individualized program of instruction. In the developmental edition the items are arranged in ascending order of difficulty, irrespective of the clusters to which they belong. A choice must be made initially between the use of these two editions. Specimen sets of both editions are included in the test kits. In either edition the test booklet consists of twelve pages, one for each test and a cover page for the summary of scores.

Some Suggested Methods and Resources for Specific Test Areas

Test: Information Processing: Observing Skills

Skill Clusters:

1. Comparing for similarity.
2. Seeing and remembering (short-term memory).
3. Completing patterns.
4. Visualizing figures after rotation.
5. Integrating eye-hand activity.
6. Identifying figures in a background.
7. Conserving mass, volume, weight, and length.

Some Ways of Developing These Skills (Excerpts)

Exercises:

1. Present two real objects, models, or pictures (flashcards or dittos) to pupil. Ask him to indicate by saying yes or no or by making a predetermined mark, whether the two objects are the same or different (say "*not* the same" for young children).

Variations:

(a) Some of the above activities lend themselves to student interaction where each one in turn devises a problem for the other.

Follow-Up:

Although verbalization is not a prerequisite for the acquisition of the above skills, it is recommended that the various items be named and processes discussed by the pupil and teacher.

For Older or More Advanced Students:

Seek content for the activities from subject areas studied at school or from areas of interest to this type of student.

These extracts are taken from that section of the test manual which suggests methods for intervention and resources that may be used for instruction. The extracts relate to Observing Skills. There are similar sections for all of the eleven tests, each containing the clusters of skills for the test, suggested exercises, variations, follow-up, and suggestions for older students.

The following is a recommended approach for deciding whether particular materials (including these listed here) should be purchased for use with particular children:

Study the Data

What needs are identified by the tests?

Determine Procedures

What procedures are likely to develop the skills or broad areas of need?

Select Materials

What materials address the kinds of needs identified, and appear to be suitable for use with the chosen procedures?

The criterion for selection should be that procedures and materials selected for use are capable of bringing about the desired student learnings.

Selected Resources for Instruction in Observing Skills

Published Materials:

1. *Cognitive Development Workbooks.* Modern Educating Corporation.

   These workbooks provide a variety of activities in these areas of cognitive skills: association, classification, problem solving, and pictorial absurdities.

2. *Dot-to-Dot Pattern Sheets.* Developmental Learning Materials.

   Can be used in pattern-completion activities.

3. *Visual Perception Skills.* Educational Activities, Inc.

   Seven color filmstrips present structured exercises in each of these areas: visual memory, visual motor coordination, visual constancy, visual discrimination, visualization, figure-ground perception, and visual matching. For use at the primary level.

These extracts suggest how one should select materials and illustrate a portion of a list of resources for instruction in Observing Skills. The materials listed appear to get at those skills which are being measured by the test items, but no claim is being made for their efficacy. These lists are not exhaustive; they are intended as starters for the use of diagnosticians or other persons on the assessment team who are not specialists in curriculum or instructional materials.

ESTIMATES OF RELIABILITY FOR THE ASSESSMENT

Tests and Group Averages (For Domains)	Kindergarten			Grade 2			Grade 6			Grades K - 8
	Test-Retest Correlation	Mean	S.D.	Test-Retest Correlation	Mean	S.D.	Test-Retest Correlation	Mean	S.D.	Test-Retest Correlation (partial)
Observing	.91	131.7	19.4	.88	165.6	11.2	.94	178.8	13.9	.91
Organizing	.87	122.9	21.0	.94	164.7	14.4	.94	182.5	17.4	.90
Relating	.93	118.6	22.4	.96	155.8	17.7	.94	176.6	18.5	.95
AVERAGE: INF. PR.	.96	124.1	19.1	.96	162.0	12.2	.98	179.3	14.8	.96
Understanding Words	.80	133.0	13.1	.89	150.0	9.4	.92	171.0	13.3	.90
Comprehending Expressions	.76	126.5	20.6	.89	159.4	11.2	.96	182.1	18.2	.88
Producing Expressions	.80	119.6	13.0	.93	149.1	12.9	.94	175.9	14.9	.92
Reading	–	–	–	.93	145.6	13.3	.94	181.9	14.6	.94
Decoding	.79	124.0	16.5	.86	170.3	12.4	.85	185.4	6.6	.93
AVERAGE: LANGUAGE	.82	121.0	10.7	.96	154.9	9.4	.97	179.3	11.8	.95
Knowing Number and Operations	.93	129.1	13.8	.86	155.5	6.6	.89	178.1	5.3	.93
Understanding Concepts	.88	134.8	9.0	.86	159.0	8.1	.88	177.2	8.1	.91
Solving Problems	.93	130.7	11.1	.87	154.8	8.6	.88	176.8	9.6	.91
AVERAGE: MATH	.96	131.3	10.5	.90	156.3	7.0	.93	177.3	7.0	.96
Number of Subjects	41	41	41	62	62	62	45	45	45	121

Note: Correlations are based on latent trait ability estimates.

This table reports estimates of reliability for each of the tests at Kindergarten, Grade 2, Grade 6, and Grades K-8 combined. Average as well as learning-disabled students were used in these studies. The method used was test-retest correlation for stability, the period for retesting ranging from two to four weeks.

ASSESSMENT CORRELATION STUDIES

SUBTESTS AND GROUPS	VALIDITY																DEVELOPMENTAL TRAIT		
	SRA Assessment Survey: Grade 2				SRA Assessment Survey: Grade 6				WRAT: Gr. K-8			Teachers' Ratings: Gr. 6							
	Composite	Reading	Language	Math.	Composite	Reading	Language	Math.	Reading	Spelling	Arithmetic	General Ability	Language	Reading	Math Competition	Math Problems	Correlation with Age	Correlation with Grade	Correlation with WISC Age
Observing	.32	.37	.29	.19	.67	.53	.57	.60	.64	.77	.76	.64	.56	.53	.59	.60	.72	.75	.65
Organizing	.43	.40	.46	.39	.65	.53	.59	.56	.64	.78	.75	.62	.58	.57	.59	.61	.74	.76	.64
Relating	.45	.51	.38	.43	.76	.67	.67	.63	.61	.74	.76	.68	.66	.58	.59	.58	.72	.75	.59
INFORMATION PROCESSING	.49	.53	.46	.42	.74	.62	.66	.63	.66	.79	.78	.69	.65	.60	.63	.64	.76	.79	.65
Understanding Words	.49	.47	.51	.44	.56	.55	.59	.44	.66	.74	.75	.42	.41	.45	.43	.39	.72	.74	.62
Comprehending Expressions	.34	.37	.32	.25	.57	.49	.58	.47	.63	.76	.75	.44	.44	.49	.48	.46	.69	.72	.62
Producing Expressions	.47	.51	.44	.42	.69	.62	.67	.53	.69	.80	.70	.58	.57	.53	.50	.54	.77	.79	.62
Reading	.71	.68	.70	.55	.71	.62	.63	.60	.60	.70	.48	.71	.68	.63	.65	.65	.63	.65	.56
Decoding	.76	.71	.73	.62	.61	.56	.70	.37	.65	.75	.55	.60	.61	.58	.43	.52	.72	.73	.52
LANGUAGE	.70	.70	.68	.58	.67	.58	.65	.55	.72	.86	.75	.63	.62	.56	.59	.59	.78	.80	.65
Knowing Number and Operations	.48	.55	.44	.49	.74	.60	.65	.67	.73	.85	.84	.74	.70	.72	.69	.70	.80	.83	.64
Understanding Concepts	.58	.54	.48	.49	.81	.65	.66	.76	.66	.79	.79	.75	.71	.71	.78	.79	.79	.81	.61
Solving Problems	.60	.61	.54	.60	.63	.54	.47	.59	.67	.78	.82	.66	.62	.63	.61	.64	.81	.84	.60
MATH REASONING	.62	.63	.56	.59	.79	.65	.64	.74	.71	.83	.84	.79	.74	.75	.77	.79	.82	.85	.63
N =	51	51	51	51	45	45	45	45	89	89	89	45	45	45	45	45	159	159	70

This table presents evidence of validity based on correlation with the SRA Achievement Survey in Grades 2 and 6, Wide Range Achievement Test in Grades K to 8, teachers' ratings in Grade 6, and developmental criteria such as age, grade, and WISC test age. The evidence suggests that the Assessment Battery is measuring some of the same school-related skills that are measured by other tests and teachers' ratings, and developmental characteristics associated with age and grade. At the same time, the moderate correlations point to variation which could have resulted from differences in content between the Assessment battery and these tests.

SUMMARY OF ASSESSMENT CALIBRATION AND NORMING SAMPLE

(By Tests and Strata)

STRATA \ TESTS		Inf. Pr. Observing	Inf. Pr. Organizing	Inf. Pr. Relating	Language Und. Words	Language Comprehending	Language Producing	Language Decoding	Language Reading	Math. Know. No. & Op.	Math. Und. Concepts	Math. Solving Probs.	TOTAL	PERCENTAGE
Region	U.S.–Northeast	143	163	76	56	175	143	95	289	89	285	169	1,683	8.4
	U.S.–North Central	814	1133	901	951	1117	818	790	833	914	855	705	9,831	48.9
	U.S.–South	216	253	344	359	243	225	320	130	359	132	333	2,914	14.5
	U.S.–West	242	85	214	216	84	241	197	121	200	122	127	1,849	9.2
	Canada	404	196	296	285	268	404	362	340	415	341	500	3,811	19.0
	TOTAL	1819	1830	1831	1867	1887	1831	1764	1713	1977	1735	1834	20,088	100.0
Community	Urban	470	605	755	754	777	475	445	541	505	540	482	6,349	31.6
	Suburban	559	258	410	445	99	569	444	371	458	370	830	4,813	24.0
	Rural & Small Town	790	967	666	668	1011	787	875	801	1014	825	522	8,926	44.4
	TOTAL	1819	1830	1831	1867	1887	1831	1764	1713	1977	1735	1834	20,088	100.0
Race	White	1637	1557	1401	1423	1591	1646	1559	1543	1744	1555	1506	17,162	85.4
	Black & Other	182	273	430	444	296	185	205	170	233	180	328	2,926	14.6
	TOTAL	1819	1830	1831	1867	1887	1831	1764	1713	1977	1735	1834	20,088	100.0
Sex	Boys	877	900	928	941	932	888	865	836	992	848	911	9,918	49.4
	Girls	942	930	903	926	955	943	899	877	985	887	923	10,170	50.6
	TOTAL	1819	1830	1831	1867	1887	1831	1764	1713	1977	1735	1834	20,088	100.0
School	Public	1374	1160	1266	1317	1224	1395	1316	1246	1411	1272	1510	14,491	72.1
	Non-Public	445	670	565	550	663	436	448	467	566	463	324	5,597	27.9
	TOTAL	1819	1830	1831	1867	1887	1831	1764	1713	1977	1735	1834	20,088	100.0

A stratified random sample of 20,088 cases was drawn from students in the four geographical regions of the U.S. (named above) and Canada. Stratification was based on region, type of community, race, and sex. In the United States students were drawn from the following states: Maine, New Jersey, New York, Illinois, Minnesota, Iowa, Florida, Tennessee, Texas, Idaho, Washington, and California. In Canada students were drawn from Nova Scotia, New Brunswick, Ontario, Manitoba, Alberta, and British Columbia. The samples were proportionate to the U.S. and Canadian population in terms of type of community, race, and sex, but had to be statistically weighted by geographical region since they were not proportionate in this stratum. The sample is representative of the student population in the mainstream of our schools in the United States and Canada. Students with special needs were included in the sample if they were drawn in the selection process, but specially included in the reliability and validity studies.

We now have some time for questions.